

AUTOMOTIVE INDUSTRIES

The Automobile

Reg. U. S. Pat. Off.
Established 1902

Vol. 62

No. 3

NORMAN G. SHIDLE, Directing Editor
P. M. HELDT, Engineering Editor
JOSEPH GESCHELIN, Asso. Eng. Editor
ATHEL F. DENHAM, Field Editor
EARL O. EWAN, Managing Editor
LESLIE PEAT, Asso. Editor
HAROLD E. HILLMANN, Asst. Editor
HERBERT HOSKING, News Editor
HAROLD M. BAKER, Detroit News Rep.
A. B. CROFOOT, N. Y. News Rep.

Contents

Production Control Expected to Aid Factory-Dealer Relation. By Leslie Peat.....	73
Bucciali Front-Wheel Drive Car Has Independent Suspension. By P. M. Heldt.....	75
Hupmobile Plant is Entirely Realigned and Completely Conveyorized. By Joseph Geschelin	76
Renault Assembly Plant Near Paris Starts Operations This Month. By W. F. Bradley	82
Terminal Material of Spark Plugs is Factor in Performance. By Hector Rabezzana and Donald W. Randolph	83
Future Solution of Economic Production Problems Depends Upon Cooperative Effort. By E. S. Chapman	88
Curtiss Tanager, Judged the Safest Aircraft in Guggenheim Contest, Was Designed to Meet Production Requirements With Few Changes. By A. B. Crofoot.....	90
Just Among Ourselves	94
Holley Aviation Carburetors Cover Wide Range	95
New Developments	97
News of the Industry	100
Financial Notes	101
Men of the Industry	102
Calendar of Events	108
Advertisers' Index	94, 95

Automotive Industries is published every Saturday by
CHILTON CLASS JOURNAL COMPANY

Chestnut and 56th Streets, Philadelphia, Pa.

C. A. MUSSELMAN, President and General Manager
J. S. HILDBRETH, Vice-Pres. and Director of Sales
W. I. RALPH, Vice-Pres. G. C. BUZBY, Vice-Pres.
A. H. VAUX, Secretary and Treasurer
JOHN A. CLEMENTS, Ass't Treasurer

JULIAN CHASE, Business Manager
Automotive Industries

GEO. D. ROBERTS
Advertising Manager

Cable Address Autoland, Philadelphia
Telephone Sherwood 1424

OFFICES

New York—U. P. C. Bldg., 239 W. 39th St., Phone Pennsylvania 0080
Chicago—5 South Wabash Ave., Phone Central 7045
Detroit—710 Stephenson Bldg., Phone Northway 2090
Cleveland—1140 Guardian Bldg., Phone Main 6860
Los Angeles—433 Petroleum Securities Bldg., Phone Westmore 9084

Controlled by United Business Publishers Inc., 239 West 39th Street, New York;
ANDREW C. PEARSON, Chairman, Board of Directors; FRITZ J. FRANK, President;
C. A. MUSSELMAN, Vice-President; F. C. STEVENS, Treasurer.

SUBSCRIPTION RATES: United States, Mexico, United States Possessions, Canada and all countries in Postal Union, \$3.00 per year; Foreign, \$6.00 per year; Single Copies 35c.

COPYRIGHT, 1929, CHILTON CLASS JOURNAL COMPANY
Member of the Audit Bureau of Circulations
Member Associated Business Papers, Inc.

Automotive Industries — The Automobile is a consolidation of the Automobile (monthly) and the Motor Review (weekly), May, 1902; Dealer and Repairman (monthly), October, 1903; the Automobile Magazine (monthly), July, 1907, and the Horseless Age (weekly), founded in 1895, May, 1918.

DRY-SYS

EQUIPMENT

For
**Enamel — Japan —
Lacquer and Core
drying and baking**

CORE DRYING AT STUDEBAKER

A four-pass, two compartment, continuous oven with monorail conveyor, heated by one *DRY-SYS* Induced Draft Heater, gas fired, delivering heated air at temperatures from 500°F. to 700°F.

This is one of the outstanding core drying installations in the industry for efficiency and economy of operation, and quality of finished cores delivered.

Our engineering department has prepared a complete description of this installation, giving data on design, construction and operation. A copy will be sent you on request.



DRYING SYSTEMS, INC.
1818 FOSTER AVE.
CHICAGO
ILL.

Send us description of the Studebaker Core Drying installation.
Name _____ Address _____
Town _____ State _____ 1929

G&O
Radiators
New Haven
15th Year

L.A.C.A.

AUTOMOTIVE INDUSTRIES

VOLUME 62

Philadelphia, Saturday, January 18, 1930

NUMBER 3

Production Control *Expected to Aid* *Factory-Dealer* Relation

Price increases, as well as changes in methods of handling clean-ups of cars about to be superseded by new models, announced last week, expected to stimulate retailer's interest.

By LESLIE PEAT

NEVER before in the history of the commercial activity of mankind has any industry established itself on the broad basis of gearing production to demand, as quickly as has the automotive business. Factory executives who spoke during the National Automobile Show in New York last week indicated almost universal agreement in this policy. With singular similarity of expression, dealers were told that the year 1930 would find definite policies of production control carried out, and that overproduction was a thing of the past.

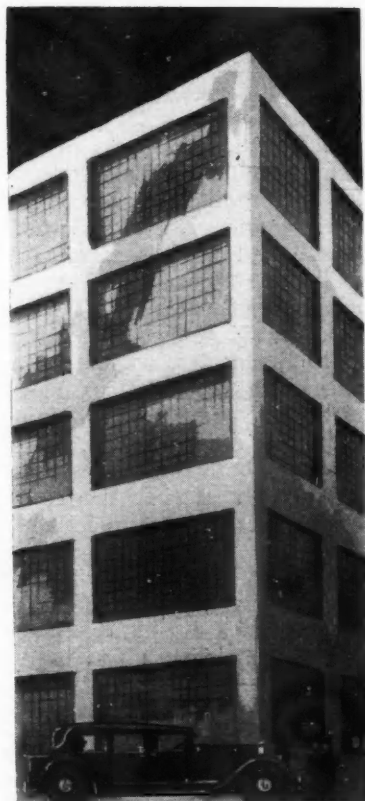
Obviously, it is improbable that the plan will be perfectly carried out, even by those companies which led the field in making production-control announcements; but the dealer unrest, which has prevailed during the last quarter of 1929 as a result of reduced profits, has crystallized the economic theory of production-control into a policy, and the reenunciation of that theory at the score or more of dealer meetings last week has had a marked effect on the retailing outlook in the industry.

There are industries which cannot cut their schedules during times of de-

pressions. Railroads must hold to their basic schedules and can cut only in the number of car loadings; it took more than half a century of railroading to develop the policy of pooling car loadings, and railroads have profited tremendously thereby. Other basic industries which have not undertaken production curtailments have struggled against tremendous odds, frequently emitting throaty gargles that have sounded for the moment very much like swan songs.

One basic industry has handled the situation of overproduction, but did so through mergers to a large degree. For a long time the steel business suffered from price reduction before the present sound programs of curtailed production became operative. Now railroads place orders for rails and other steel to be delivered at times of normally low production. This balances uneven requirements for structural shapes and demands from the automotive and other seasonal industries, and proves one point of economy of operation resulting through controlled management.

As the year 1930 opens on the controlled production policies, authorita-



tive spokesmen for the woolen industry are looking with interest to the automotive industry. The woolen industry, one of the ancestors of American business, has suffered the woes of price-cutting and uncontrolled production, and until recently had done nothing to control or administer the retailing activities of the industry. After nearly a century of operation, the industry undertook horizontal mergers which had been promulgated at the turn of the century as the panacea for business depression. Some economies were found in bringing mills under one management, but as the individual efficiency of mills increased, the advantages of horizontal mergers decreased. The economies of one group were approximately equal to the sum total of the economies of separate concerns which had not merged.

Perpendicular mergers are now being developed in the woolen business, as in other lines, but the effectiveness of these seems to depend upon interlocking directorates. Attempts to emulate the automobile distributor-sales set-up have not been so successful. When the automobile business began, its retailing was developed along the same lines it is now continuing; development of the functions of the retailing end of the business have simply been improvements of what has proved itself to be an adequate method of distribution. So the automotive industry has illustrated to other industries a way to do things better than they have been doing them. Now the production-control policy is seen more as a life-saver by several leaders in other industries than merely as a casual experiment made by what heretofore has been generally considered as a luxury class of business.

With the announced program of controlled automotive production have come some announcements of price increases for automobiles, and the result will be that the industry will fare well in 1930, unless some untoward occurrence is experienced during the year.

In this matter of price policies, too, the automobile men are giving evidence of going contrary to usual practice of other industries in some respects. Overproduction in most industries has always resulted in price reductions.

Price cuts have been made by the retail end of the automobile business, to be sure, although most of them have come in the form of over-allowances on used cars. In recent years, however, the open bargain sale has made its appearance more frequently in various communities when dealers found themselves faced with the necessity of a clean-up of models about to become obsolete.

Price cuts by automobile manufacturers at this time of overproduction, on the other hand, have been slightly less numerous than price increases. Temporary or permanent inside trading discounts, of course, always account for a few more decreases than appear in the public advertising pages. Nevertheless, a goodly number of automobile makers have raised prices at the end of a period of overproduction. Even where reductions have been made this year it would seem as though

care had been exercised not to get the buying public into a "cut price" or "bargain" frame of mind. Even in the case of the lowest-priced cars, quality and performance appeals are being emphasized at least as strongly as the price reductions in the sales and advertising approach being made to the public.

Pure price appeal has proved itself ineffective in automotive markets. No maker is resorting to it today. Many of them have taken the opposite road entirely and have increased their lists.

In other lines, where the unit price is much lower, or where the life of the commodity is not so long as that of the automobile, price reductions have not been so palpably serious. From time to time, for instance, the woolen mills unloaded their stocks at reduced prices, and the retailing industry did not suffer because there is no trade-in business in the clothing industry. Not suffering an immediate reaction, therefore, the woolen industry continued operation, and made further cuts until the industry as a whole operated at an actual loss. Such an experience has been suffered time after time in the worsted industries, as in scores of other basic businesses, and until lately there seemed to be a common agreement that nothing could be done about it.

Automobile manufacturers this year seem to have the general and widespread support of their dealers in the new announcements of policies. The industry is old enough and active enough to have gathered sufficient experience and customer-reactions to know pretty well the mind of the public.

A change, which some factories, at least, seem likely to make this year, has to do with the method of handling clean-ups of cars about to be superseded by new models. It probably is going to be more common this year for factories to sell clean-up cars to dealers at reduced prices, and to give rebates on the old models dealers may have in stock at the time the new model is announced. In fact at least one factory has added a clause to its contract providing that, if a dealer has more than 3 per cent of his year's contract on hand at the time the new model is introduced, the factory agrees to rebate him on the excess. For example, under this clause, a 200 car dealer would be rebated on any old models in excess of six which he had in stock at the time of the new model announcement.

Such changes in the method of handling clean-ups seem fair and in line with practices in other lines of business. Where they are made, they will be a big help to the dealer, as losses on clean-ups in recent years have been an important cause of unsatisfactory dealer profits.

Dealers who attended the factory meetings during the New York Show discussed price increases and controlled production policies in terms of larger profits. Many experienced large volume of sales during 1929 but profits did not come up to their expectations.

If production control is carried out during the next 12 months, other industries will again have the chance to note automotive leadership.



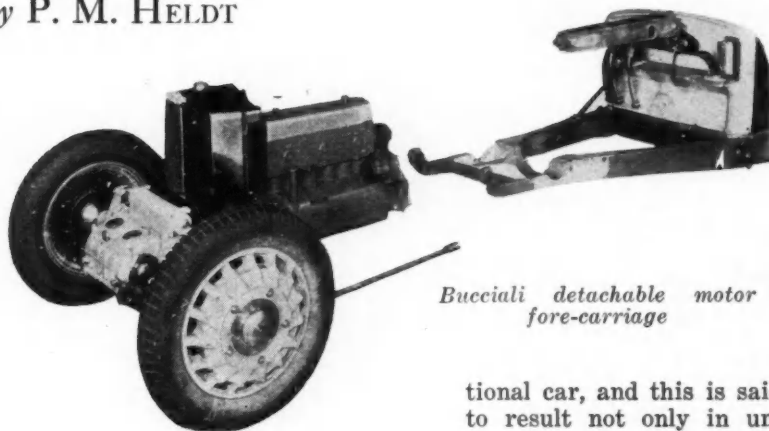
Bucciali Front-Wheel Drive Car Has Independent Suspension

*Transmission is arranged with its shafts transverse to the frame
and speed change mechanism is incorporated in the
drive beyond the speed reducing gear.*

By P. M. HELDT

A FRONT-WHEEL drive car which also possesses the feature of independent suspension for both the front and the rear wheels has been under development by Bucciali Brothers of Paris since 1925, and patents have been taken out on its various features. The car has been in production in Europe for some years and was exhibited at several of the Paris automobile shows. A car of this type has now been brought to this country and was demonstrated in New York during the week of the National Automobile Show. It was brought over by Angelo Bucciali, of the firm producing it, and Coldwell S. Johnston, an American business man resident abroad, who was formerly commercial attache of the U. S. Government. From New York Messrs. Bucciali and Johnston will proceed to Detroit, where they will be located at the office of Ch. A. Viriot, vice-president of Silentbloc, Inc., 2-133 General Motors Building. An effort is being made to interest American manufacturers in the Bucciali American patents.

Two photographs of the car are reproduced herewith. One of its unusual features is that the transmission is arranged with its shafts transverse to the car frame and that the speed changing mechanism is incorporated in the drive beyond the speed reducing gear. The clutch shaft carries a bevel pinion which meshes with a bevel gear on a transverse shaft to effect the normal speed reduction between engine shaft and differential. These bevel gears are said to be cut with double teeth, whereby end thrust is eliminated. The impression which this description conveyed to the writer was that the pinion and gear are of the spiral bevel type and each consists virtually of two gears, with right and left hand teeth respectively. Since the change speed gears are located beyond the speed-reducing gears, their speed is very much lower than in a conven-



*Bucciali detachable motor
fore-carriage*

tional car, and this is said to result not only in unusually silent operation but in easy shifting as well.

The ring gear is mounted on a hollow shaft which on one end carries the constant-mesh pinion and on the other a member of a dog clutch for the direct drive. The constant-mesh pinion meshes with a constant-mesh gear on a secondary shaft parallel with the primary shaft and, of course, also extending transversely to the frame. This secondary shaft, in addition to the constant-mesh gear, carries pinions for the first, second and third speeds, meshing or adapted to mesh with corresponding gears on a transmission drive shaft which is concentric with the driven bevel gear and extends through its hollow shaft. The pairs of gears for the second and third speeds remain constantly in mesh and are controlled by dog clutches. The low speed, on the contrary, is controlled by sliding its pinion along

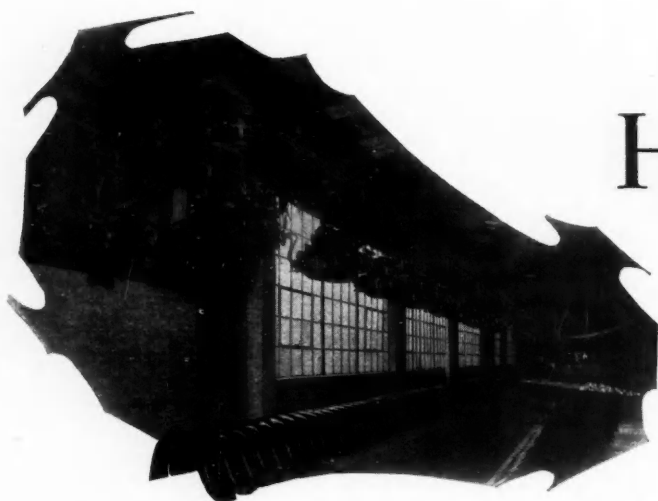
the splined shaft. For the reverse, a reverse idler may be brought into mesh with the pinion and gear of the low-speed set.

The driven shaft of the transmission drives the differential housing. Each side gear of the differential carries one of the axle-shaft stubs, to which is secured a universal joint. There is another universal joint at each wheel, whose center lies in the knuckle-pivot axis. One of the universal joints includes the functions of a sliding joint.

(Continued on page 96)



Front view of Bucciali front-wheel drive car, showing how wheels remain vertical, although one is raised above the level of the other



Overhead conveyors carry Hupmobile engines to assembly line from separate department in Building No. 1. Above is shown the powerplants emerging from the baking oven which bridges the space between the two buildings

Hupmobile Plant is and Completely

Chandler buildings at Cleveland, Ohio, skillfully remodeled. Practically every known type of conveyor used in the various assembly operations.

ON April 15, 1929, the last Chandler car came off the assembly line of the Chandler plant at Cleveland, Ohio, which had been acquired by the Hupp Motor Car Co. Six weeks later, the first Model S six-cylinder Hupmobile rolled out under its own power from an entirely new assembly line and a completely realigned plant.

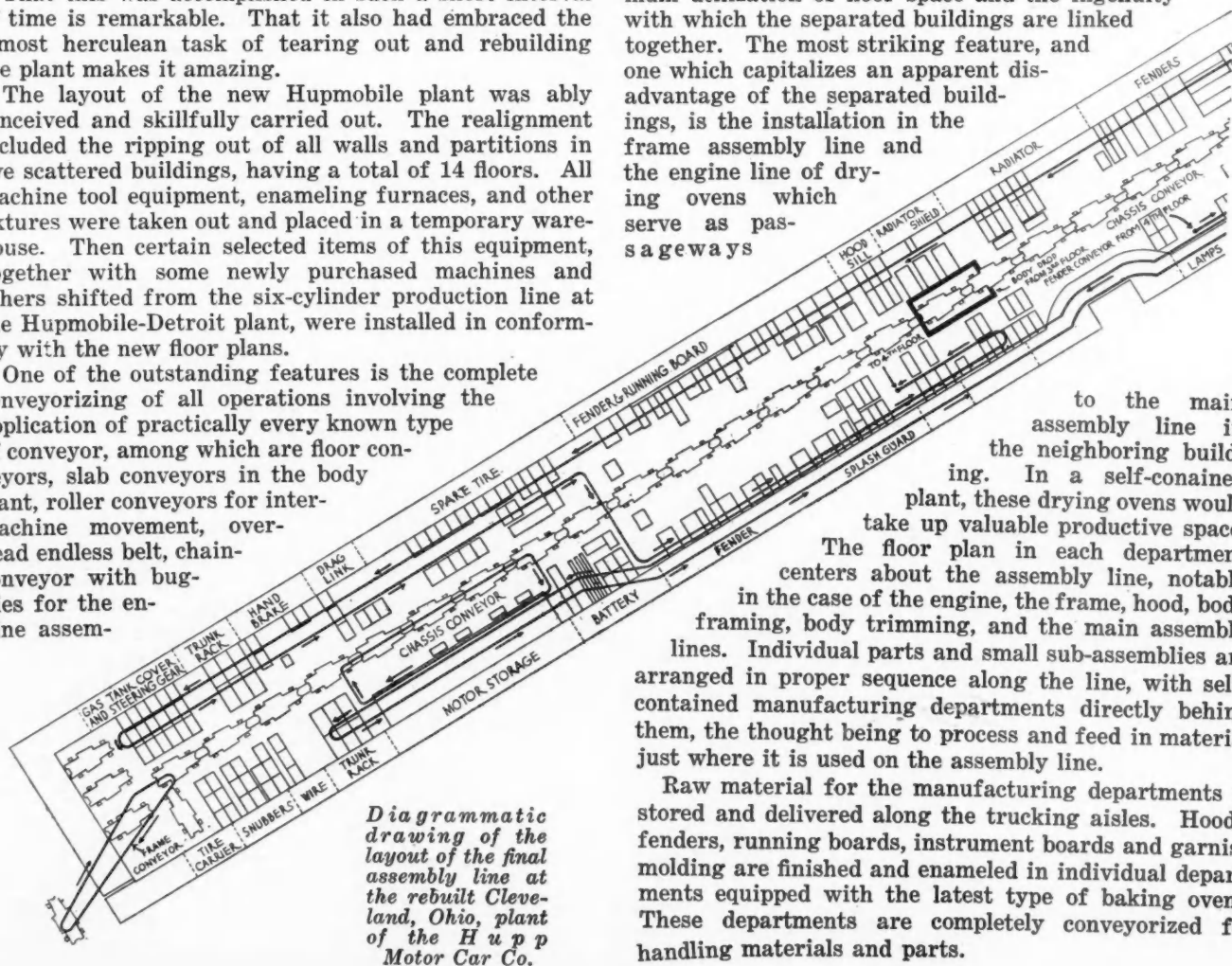
That this was accomplished in such a short interval of time is remarkable. That it also had embraced the almost herculean task of tearing out and rebuilding the plant makes it amazing.

The layout of the new Hupmobile plant was ably conceived and skillfully carried out. The realignment included the ripping out of all walls and partitions in five scattered buildings, having a total of 14 floors. All machine tool equipment, enameling furnaces, and other fixtures were taken out and placed in a temporary warehouse. Then certain selected items of this equipment, together with some newly purchased machines and others shifted from the six-cylinder production line at the Hupmobile-Detroit plant, were installed in conformity with the new floor plans.

One of the outstanding features is the complete conveyerizing of all operations involving the application of practically every known type of conveyor, among which are floor conveyors, slab conveyors in the body plant, roller conveyors for inter-machine movement, overhead endless belt, chain-conveyor with bug-gies for the engine assem-

bly line and special rack conveyors through the enameling and lacquering ovens. Plant No. 2, located about two miles away from the central group, which was the birthplace of the last Cleveland car, was converted into a modern body plant, featuring the latest developments in the art.

Among the highlights of the new plant are the maximum utilization of floor space and the ingenuity with which the separated buildings are linked together. The most striking feature, and one which capitalizes an apparent disadvantage of the separated buildings, is the installation in the frame assembly line and the engine line of drying ovens which serve as passageways



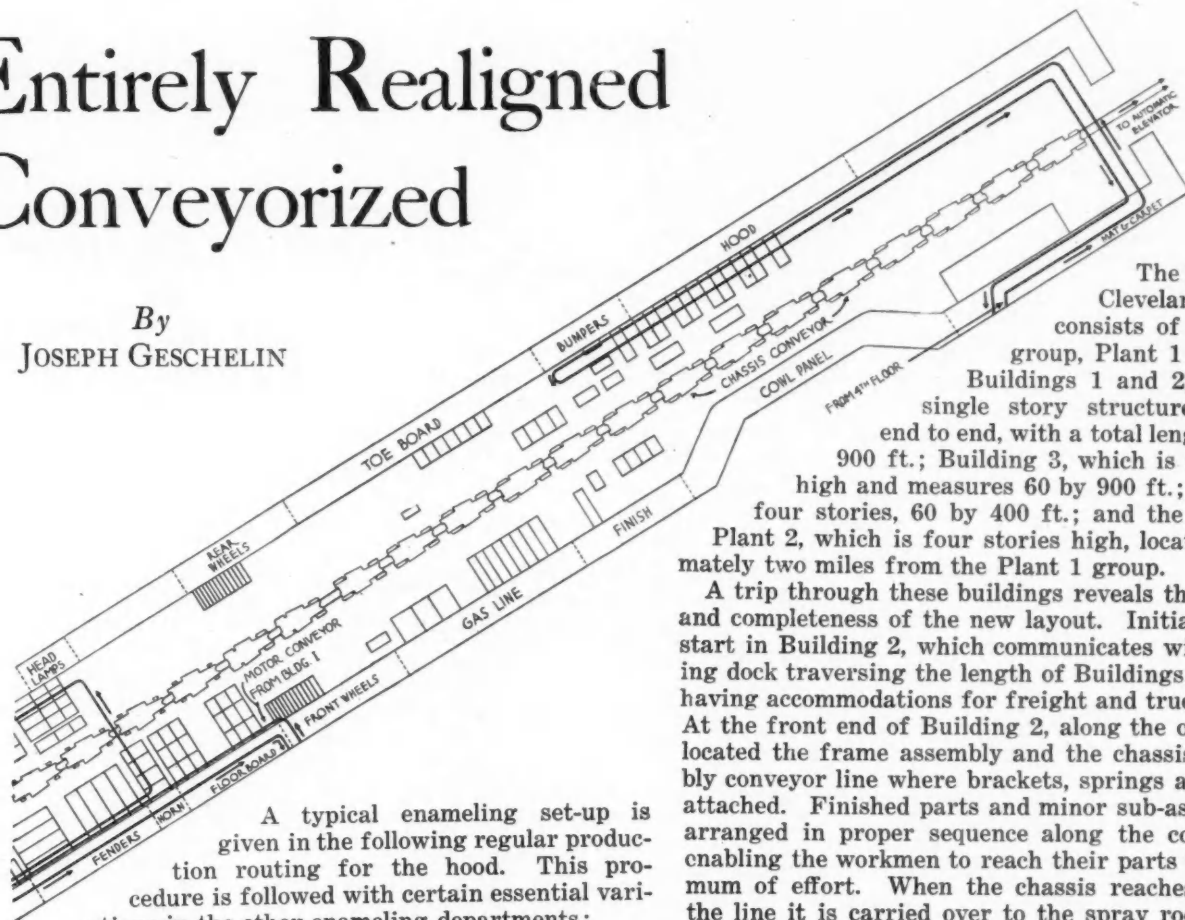
Diagrammatic drawing of the layout of the final assembly line at the rebuilt Cleveland, Ohio, plant of the Hupp Motor Car Co.

to the main assembly line in the neighboring building. In a self-contained plant, these drying ovens would take up valuable productive space. The floor plan in each department centers about the assembly line, notably in the case of the engine, the frame, hood, body framing, body trimming, and the main assembly lines. Individual parts and small sub-assemblies are arranged in proper sequence along the line, with self-contained manufacturing departments directly behind them, the thought being to process and feed in material just where it is used on the assembly line.

Raw material for the manufacturing departments is stored and delivered along the trucking aisles. Hoods, fenders, running boards, instrument boards and garnish molding are finished and enameled in individual departments equipped with the latest type of baking ovens. These departments are completely conveyerized for handling materials and parts.

Entirely Realigned Conveyorized

By
JOSEPH GESCHELIN



A typical enameling set-up is given in the following regular production routing for the hood. This procedure is followed with certain essential variations in the other enameling departments:

1. Assemble upper panel to side half.
Inspection.
2. Load (6) hood halves on cross-bar conveyor.
Wash automatically.
Dry automatically.
Cool automatically.
Dip automatically.
Bake automatically.
3. Transfer hood halves from bar conveyor to monorail.
4. Spray surface coat.
Bake automatically.
Cool automatically.
5. Dry sand surfer.
Inspection (orange peel and scratches).
6. Spray ground coat (light colors).
Dry automatically.
7. Spray No. 1 lacquer.
Dry automatically.
8. Spray No. 2 lacquer.
Bake automatically.
Cool automatically.
9. Oil sand half hood (2-man operation).
Inspection ding and spot spray.
10. Spray mist coat.
11. Polish half hood and sand and polish all repairs.
Inspection.
12. Cut in black molding on half hood, touch up and stripe louvers and moldings.
Dry automatically.
13. Assemble buttons.
14. Assemble hinges.
Finish inspection.
15. Assemble hood catches, handles and corner pads.
16. Load on conveyor and deliver hood halves to chassis assembly line.

The Hupmobile-Cleveland plant consists of the central group, Plant 1 comprising Buildings 1 and 2, which are single story structures standing end to end, with a total length of about 900 ft.; Building 3, which is four stories high and measures 60 by 900 ft.; Building 6, four stories, 60 by 400 ft.; and the body plant, Plant 2, which is four stories high, located approximately two miles from the Plant 1 group.

A trip through these buildings reveals the continuity and completeness of the new layout. Initial operations start in Building 2, which communicates with the loading dock traversing the length of Buildings 1 and 2 and having accommodations for freight and truck deliveries. At the front end of Building 2, along the outer wall, is located the frame assembly and the chassis sub-assembly conveyor line where brackets, springs and axles are attached. Finished parts and minor sub-assemblies are arranged in proper sequence along the conveyor line, enabling the workmen to reach their parts with a minimum of effort. When the chassis reaches the end of the line it is carried over to the spray room, where it is laid sidewise on the conveyor, sprayed, and then carried through the drying oven which bridges the passageway between Building 2 and the main assembly line on the second floor of Building 3.

Cylinder blocks from the foundry are brought in by truck and stored at the other end of this building where the motor line begins. Each is lifted onto the roller conveyor and passes between the two giant Ingersoll milling machines shown in Fig. 2, where the top and bottom faces are rough and finish-milled in one operation. The block then passes through successive finishing operations and sub-assembly operations so that when it reaches the end of the line, at the front of Building 2,

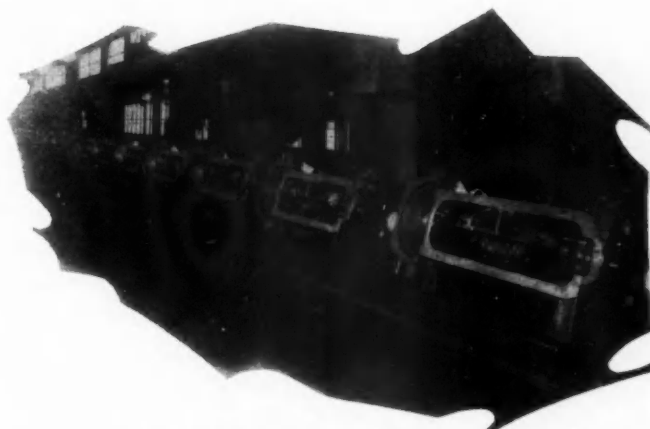


Fig. 1—Looking down the engine line. Buggies carry the blocks on their sides, inclined slightly downward to permit easy access

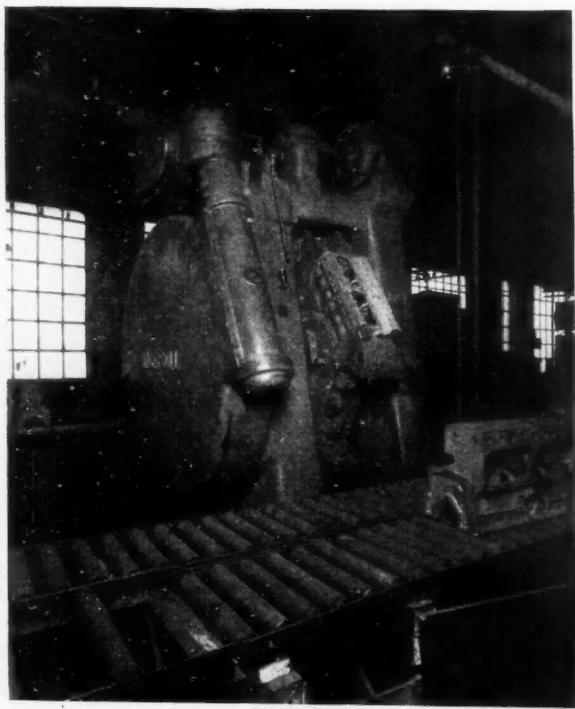


Fig. 2—Two Ingersoll milling machines are used to rough and finish mill the upper faces of Hupmobile engine blocks. A second machine, which is not shown, is opposite the machine in this view, on the other side of the conveyor

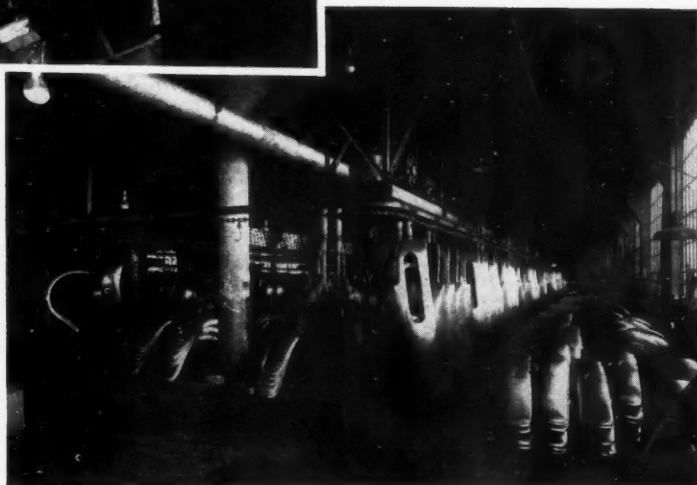
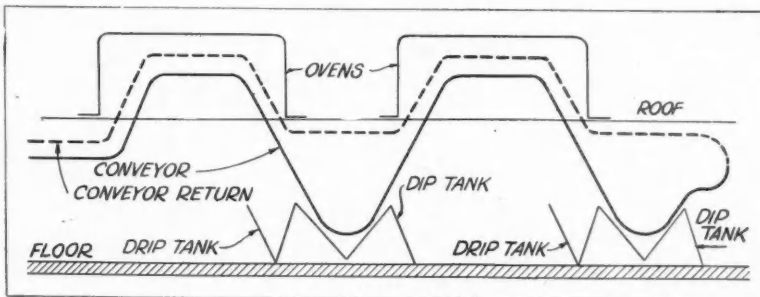


Fig. 3—A corner of the fender department, with its buffer and grinder equipment

Fig. 4—Details of the fender enameling layout on the fourth floor rear of Building No. 3. Drying ovens are located on the roof, the conveyor line passing through openings in the ceiling



it is ready for the engine assembly line, which it meets at the rear of Building 1.

Building 1 contains the engine assembly line, which is fed by the self-contained manufacturing departments. The structure houses also the block test department. The chief assembly operations along the engine line, starting with the cylinder block assembly at the rear end and progressing forward, are given below. Self-contained manufacturing departments concerned with the processing of parts for each of these operations, are arranged in the same sequence:

1. Camshaft and timing sprocket assembly.
2. Crankshaft and flywheel assembly.
3. Clutch release and bearing assembly.
4. Valve lifter bracket assembly.

5. Connecting rod and piston assembly.
6. Generator and sprocket assembly.
7. Timing sprocket cover assembly.
8. Rear main bearing oil retainer.
9. Water pump assembly.
10. Ignition assembly—wiring unit.
11. Intake and exhaust manifold assembly.
12. Oil pump assembly.
13. Distributor assembly.
14. Fan pulley assembly.
15. Purolator to pump oil line.

When the engine reaches the end of the line at the front end of Building 1, it is complete with the exception of the oil pan, which is attached later. Then the engine is lifted off the conveyor and carried to the block test by an overhead hoist. An interesting feature of the block test, and probably an unusual one, is that the test block serves as the oil pan and holds the oil for the engine. The oil pan is constantly supplied with fresh oil by means of a special arrangement which maintains oil at the proper level and circulates it continuously through a return line and a filter that removes all sediment.

This eliminates the usual operations of filling the engine with oil, and then draining it, and later removing the oil pan to clean out the sediment. When the block test has been completed, the engine is lifted by an overhead hoist, carried down to the rear end where the oil pan is assembled, and then to the first of two booths, one on each side of the conveyor. The right-hand side of the engine is sprayed in the first booth and as the engine emerges an operator fills it with oil and pushes it over to the other

booth where the opposite side is sprayed. Then the engine is hooked onto the overhead conveyor that carries it through the drying oven which connects Building 1 and the main assembly line on the second floor of Building 3.

Operations on the fourth floor of Building 3 are devoted to the finishing, handling and enameling of hoods and fenders. The complete routing of the hood which has been described gives in complete detail all of the steps in the process. Fig. 3 is a view in the fender department showing the buffing and grinding equipment.

One of the big problems confronting the planners of this project was the limitation of space, and they overcame it in an ingenious manner in the fender depart-

ment. It was found that the ceiling height made it almost impossible to install the dip tanks, drip tanks and ovens linked by the continuous overhead conveyors. This was accomplished, as shown in Fig. 4, by locating the ovens in pent houses on the roof. The conveyor now passes through the dip tank, over the drip tank, and then into the first drying oven through an opening in the ceiling, the process being repeated in the adjacent installation. When the hoods and fenders have been completely processed, they progress on overhead conveyors down to the assembly line on the second floor.

The third floor of Building No. 3 is devoted to the finishing and striping of the bodies arriving from Building 6 through a passageway under the street level which communicates with an elevator to the third floor. After being polished and striped, the bodies are carried by an overhead crane which lowers them to the assembly line on the second floor through an opening in the floor. Finishing and enameling of running boards also is accomplished on the third floor, the process being similar to that on the fourth floor. Another installation takes care of the finishing, striping and drying of wood, wire and disk wheels. Finished wheels are fed according to schedule down four chutes to the assembly line.

Fig. 5 shows the layout on the second floor of Building 3. The main assembly line, 750 ft. long, starts with the chassis sub-assembly at the rear end of the structure, and then progresses to the front end, where the finished car is driven off under its own power to an automatic elevator which moves down against an emergency brake and counterweight and rises within a short interval after the car has been driven off. At the proper point in the assembly line the engine is fed in from the overhead conveyor. About midway of the line the chassis meets the body, which is lowered from the third floor. A little ahead of this are located the wheel chutes.

Here again the parts and sub-assemblies as well as the departments producing them are located in proper sequence along the assembly line.

The first floor of Building No. 3 houses the final inspection department and the floor-type running-in stands. There the finished car is given the equivalent of a long road test. When the car has been inspected and all adjustments made, it is driven away to the shipping dock.

The last structure in the central group is Building No. 6, which houses the service stores and shipping department, the body finish assembly and the equipment for finishing and lacquering garnish moldings and instrument boards. Service stores and the shipping



Fig. 7 — One of the three lines in the trim department. Raw material and sub-assemblies are stored across the aisle

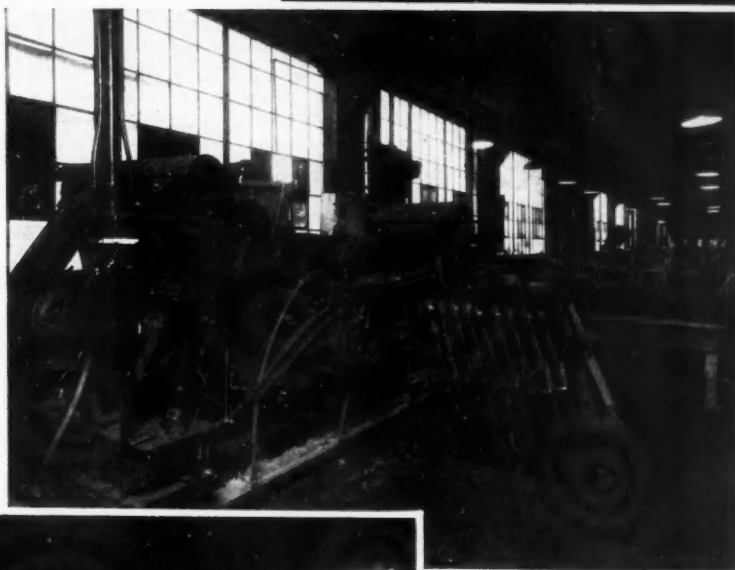


Fig. 6—A bay in the welding department of the Hupp body plant (above). This flash welder completes the cowl assembly shown in the background



Fig. 5—Looking down the lower portion of the assembly line (left). The latest type of lighting equipment, including connections at each station for plugging in various tools, is a feature

department are located on the first and second floors of this building. The storage for large and heavy parts and the service shipping department are located on the first floor, which is traversed by an endless belt conveyor. Small service parts are stored on the second floor, the bins being linked by an endless belt conveyor which communicates with a gravity drop to the shipping floor downstairs.

Finish-trimmed and lacquered bodies are delivered to Building 6 on trailers from Plant No. 2. They are carried up a special elevator to the third floor assembly line, where the garnish moldings, instrument boards and hardware are installed. Finished bodies as they come off the assembly line are wheeled to a special "lowerator," which carries them to the passageway below street level, communicating with Building 3 across the street. Assembly operations along the line are greatly facilitated by an overhead trolley system which acts as a feeder line and carrier for the high-cycle electric tools. This trolley consists of two exposed electrically charged cables carrying the connection to the electric tools which can follow with ease the movement of the body on the conveyor.

Garnish moldings and instrument boards are processed completely from the white metal on the fourth floor of Building No. 6, and are carried down by an overhead conveyor to the body assembly line on the third floor.

Latest ideas in body plant layout and body manufacture are incorporated in Plant No. 2; this building is 80 by 900 ft. and four stories high. It houses all operations, starting with the welding of panels and concluding with the finished, lacquered and trimmed bodies, which are loaded on trailers and carted over to Building 6 for the final operations. Incoming raw and finished materials arrive at loading docks at the front and rear ends, whence they are distributed to the points of consumption in the building.

The first floor is devoted entirely to welding operations and sheet metal stores. The equipment is modern and includes every type that can be used profitably in quantity production. Some idea of the magnitude of the operations on this floor may be gained from Fig. 6, which is a view of one of the bays in the forward half of the building. It also shows one of the large flash-welders, this one being used for the flash-welding of the cowl assembly.

Welded sub-assemblies are carried on elevators from the first floor to the second floor, where the bodies are framed. Operations on the second floor begin at the front end, where the body is built up in a collapsible built-up wooden jig. The wood frame and cowl assembly are lifted onto the slab conveyor where the roof and rear quarters are attached. As the body progresses, other units are attached, and the doors, which circulate through the department on an overhead conveyor, are hung. Here again the various sub-assemblies are built up in self-contained departments located right off the assembly line and arranged in the sequence in which they are used. This line, too, is traversed overhead by live feeder wires to which are hooked the high-cycle electric tools which can be moved along with the work without necessitating long connections to power outlets.

The framed bodies when completed are carried to the fourth floor, where they go through the finishing and lacquering process. The Deoxidine spray process cleaning is the first step. From the spray booth the bodies progress through a drying oven, after which the Deoxidine coat is wiped off, leaving the metal clean and smooth. The body then goes through two priming coat operations and a wet rubbing. It is then placed on a floor conveyor, passes through color spray booths, drying ovens, doubles back again and is inspected. On the return trip it undergoes a mist spray, goes through the drying oven and is given a final rubbing. The body is finish-lacquered, and as it comes off the line it is lowered to the third floor.

The trimming department on the third floor has separate conveyors for the sedan, roadster and coupe. Cushions, backs, panels and other sub-assembly units are prepared directly off the assembly line and fed directly to it. One section of the trimming line shown

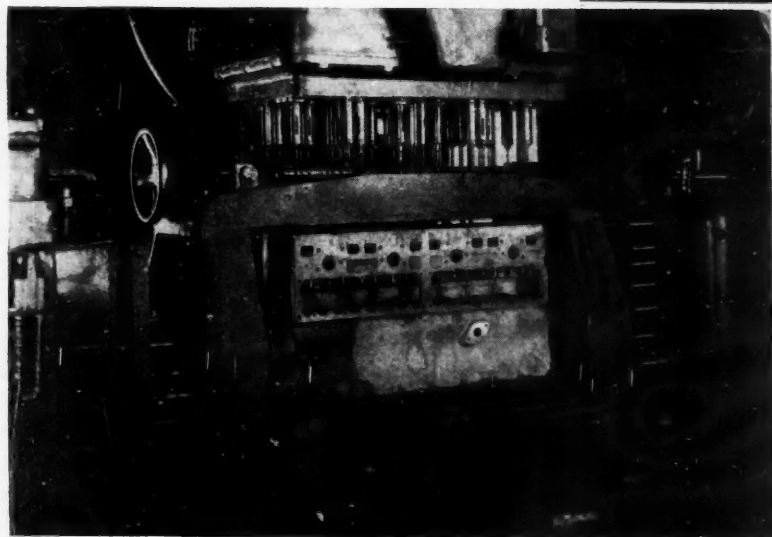
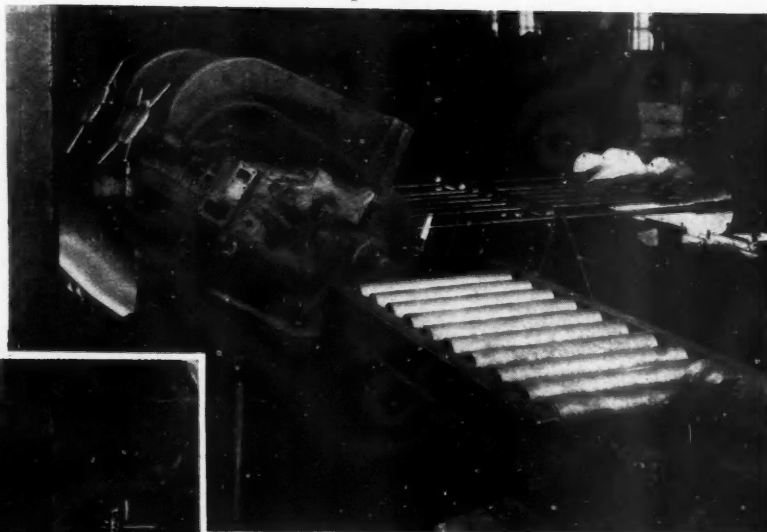


Fig. 9 (above)—Drilling angular oil leads through main bearings. An unusual feature is the trunnion-type fixture which swings the block into proper alignment with the horizontal drills

Fig. 8—The three-way Baush drilling machine shown at the left completes a total of 61 holes in the top, front and rear of Hupmobile engine blocks



in Fig. 7 brings out the details of the material storage along the assembly line. Departments making up these various units are located to the right of the storage racks. The bodies progress on buggies through the trimming assembly line, and when completed are carried down to the trailer loading platform by means of an especially designed "lowerator." An unusual feature in the trimming department is an endless belt conveyor running between the banks of sewing machines. Operators throw the finished work on the belt which carries it out to the end of the line, thus eliminating another handling operation.

The paint-mix department is an interesting corner of the fourth floor of Plant 2. Fourteen different colors of lacquer are used, each color being stored in a separate drum fitted with a constantly running agitator. The large drums are connected to small distributing drums from which the lacquer is piped under air pressure to every spray booth in the building. A similar installation is found in the other buildings to assure uniformity in colors throughout the plant.

In Detroit the transition from the six-cylinder to the new eight-cylinder model was accomplished quite smoothly. The last six-cylinder model built there had been well tooled up for economical production, so that the changes were centered about equipment which was essentially six-cylinder equipment and could not be adapted to eight-cylinder production. Consequently, the assembly lines throughout the crankcase department are unchanged except to accommodate some of the new machines. Wherever possible, the original six-cylinder equipment was retained and the machines in the original eight-cylinder department shifted over and adapted to the main plant.

The chief additions in machine tool equipment are the new multiple spindle machines which are capable of a

much greater output because of hydraulic mechanisms. One of these, a three-way, bridge-type Baush drilling machine, is shown in Fig. 8. Six new Pratt & Whitney vertical rifle drilling machines have been installed in the connecting rod department to replace a battery of horizontal drilling machines which were used formerly. Another interesting installation is the Barnes horizontal drilling machine for drilling the angular oil holes in the main bearings. Fig. 9 shows this machine set-up with the block in place, and illustrates the trunnion fixture which is used to swing the block into proper relation with the horizontal drills. Another new machine designed to step up production is an Ingersoll milling machine which straddle mills main bearings and the oil slinger groove in the rear bearing in one operation. Of unusual interest is the fixture illustrated in Fig. 10, which is employed for water-testing cylinder block passages. It is located directly on the main line, and is arranged for quick operation, enabling one man to keep up with the progress of the line.

Hupmobile engineers have demonstrated that one way to speed up operations is to segregate those operations which tend to slow up a high-cycle set-up, such as the multiple spindle drilling and tapping machine. One example of this is the horizontal machine for drilling angular oil holes, which has been described. Another is the installation of a No. 14 Natco salvaged from the connecting rod department to drill several long holes in the cylinder block.

A satisfactory way to handle and transport matched sets of connecting rods and piston assemblies is found in the special carriage shown in Fig. 11. The eight-cylinder carriage is used in Detroit and a six-cylinder carriage of similar design in Cleveland.

A number of interesting improvements are seen in the eight-cylinder production line, among which are the use of split bronze bushings in the small end of the connecting rod and bimetal split bushings, which are pressed in the camshaft bearings. Two narrow split bronze bushings are pressed in the small end of the connecting rod, one from each end, on the Hannafin press. The combined width of the two bearings is less than the width of the connecting rod at that point and the space between acts as the oil groove, thus eliminating one operation. The finished bearing is next burnished on an adjacent press and then diamond bored to the desired tolerance.

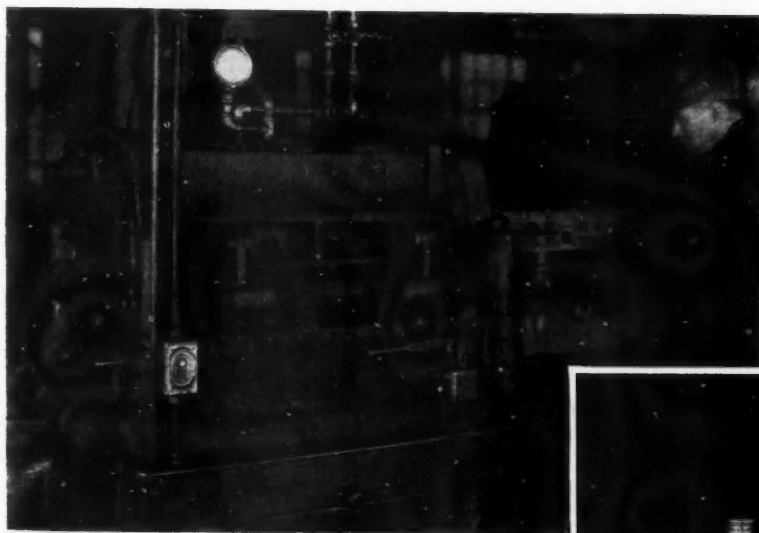


Fig. 10 (above)—A newly designed fixture for testing water passages in the Hupmobile engine block. Water is applied at a pressure of 80 lb. per sq. in.

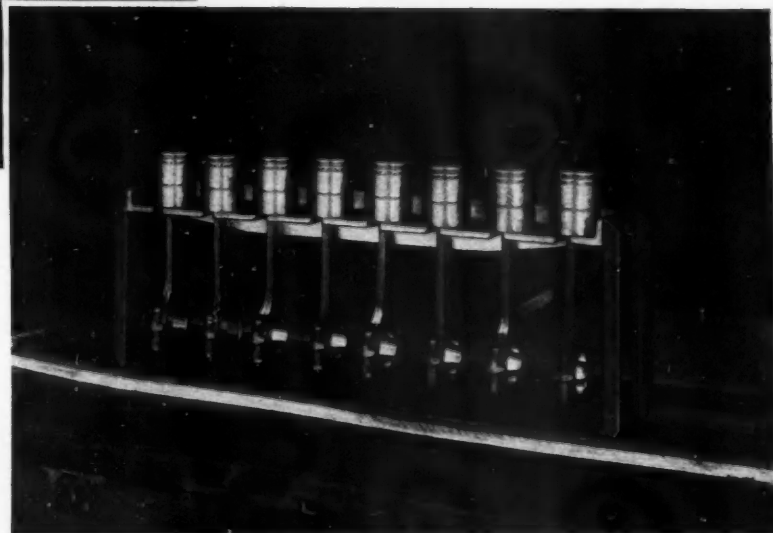


Fig. 11 (right)—The rack used for carrying matched connecting rod and piston assemblies from inspection to engine line

Renault Assembly Plant Near Paris Starts Operations *This Month*

First step in the enlargement of factory was decided on as the result of the visit of the company's chief executive to the United States eighteen months ago. Capacity is 600 cars a day.

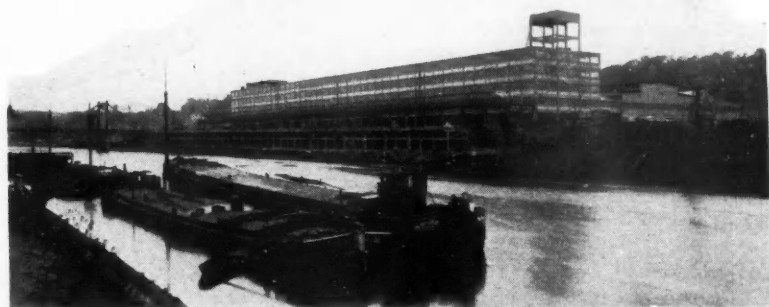
By W. F. BRADLEY

A NEW assembly plant, built on the Island of St. Germain, at Billancourt, near Paris, with a length of 750 ft. and a width of 500 ft., has been completed as an extension to the Renault factory and will be in full operation this month.

This is the first step in the enlargement and reorganization of the factory in France, decided on as the result of Louis Renault's visit to the United States 18 months ago, when he was the personal guest of Roy D. Chapin and was entertained by the National Automobile Chamber of Commerce.

Louis Renault purchased the Island of St. Germain, which lies in the River Seine, just south of Paris, linked it up to his present factory by a bridge 35 ft. wide, and built on it a modern assembly plant, one-half of which is four stories high and the other half two stories high. This will be used for the assembly of passenger cars and light trucks having the same units as passenger cars, all the parts for which will be built in the existing factories. The capacity of the new assembly plant is 600 cars per day.

Employing 32,000 hands, the Renault automobile fac-

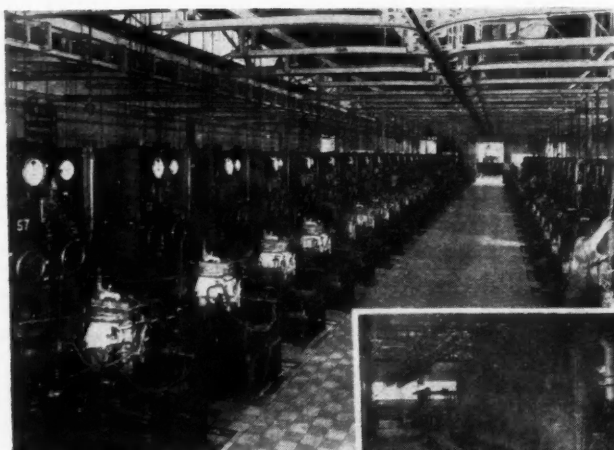


The Renault plant is located on an island in the River Seine, near Paris. It has a capacity of 600 units a day

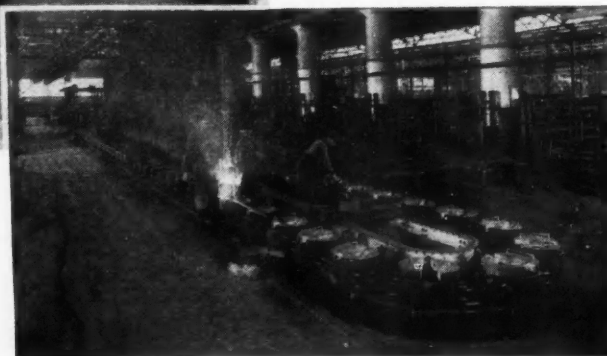
tory is the biggest in France, for in addition to automobiles several models of trucks, agricultural tractors and aviation engines are produced. With the exception of glass, tires, cloth, paint and varnishes and some sheet metal, the entire automobile is produced under the Renault roof. This policy of independence of outside supplies is justified on the grounds that French component manufacturers could not be induced to invest the capital necessary for big production.

Intimates realized that Louis Renault had been impressed by what he saw in the United States, but it was not until recently that he gave any indication of his new and aggressive program to secure a greater share of the world's markets. Louis Renault recently stated the French automobile industry must adopt new methods or die. These methods must provide for maximum production with the minimum of effort in the minimum of time.

Louis Renault personally holds about 95 per cent of the stock of the Renault Automobile Co.



Engine test line at the new Renault factory. Note the overhead conveyor system



Aluminum casting at the St. Germain plant of the Renault company follows modern "in-line" production methods

Spark Plug Terminal Material Is Factor in Performance

Employment of a new electrode alloy substantially reduces the sparking voltage required. Engine speed, temperature and proper carburetion are important

By HECTOR RABEZZANA and DONALD W. RANDOLPH
Chief Spark Plug Engineer and Research Engineer, AC Spark Plug Co.

IN the ignition circuit of an internal combustion engine, the voltage generated by the coil or magneto is determined by the break-down or "sparking" voltage at the spark plug gap.

For gaps below 0.035 in., the voltage required to jump the spark plug gap is nearly proportional to its width, as well as to the density of the gases in the gap. Accurate measurements show that under apparently the same engine conditions consecutive sparks may have as much as 50 per cent variation in the break-down or "sparking" voltage.

Under ideal conditions, the typical ignition coil or magneto is always able to generate a voltage sufficiently high to break down a spark plug gap. However, under operating conditions, the presence of an electrically conducting coating on the spark plug insulator forms a shunt across the secondary which reduces the maximum voltage the system can deliver at the gap.

The coating on the insulator which is deposited by the burning gases is not always composed entirely of carbon. The reddish color of this deposit, sometimes found on the insulator, indicates that it contains iron oxide. This iron oxide becomes a fairly good electrical conductor, especially at high temperature, thus increasing the conductivity of the shunt across the secondary and further aggravating the conditions that cause a plug to "cut out." Some anti-knock fuels may cause a coating which is a good electrical conductor. The larger the conductance of this shunt, the lower the maximum voltage which the coil is able to deliver to the gap. A condition is finally reached where the spark misses because the highest voltage the coil can deliver is less than

that sometimes necessary to break down the spark plug gap.

Investigation of this ignition miss led the AC Spark Plug Company to make an extended study of the electrical characteristics of the ignition system in engine operation. This research and development work, which was conducted by AC engineers and associates, has brought about a better understanding of the subject, resulting in development of an improved material for spark plug electrodes.

A brief summary of the factors affecting the secondary potential and the break-down or sparking voltage of plugs under operating conditions is herein set forth. The accompanying curves show typical characteristics.

The maximum voltage generated by the coil must be above the sparking voltage of the spark plug gap if ignition missing is to be avoided. Therefore, it is im-

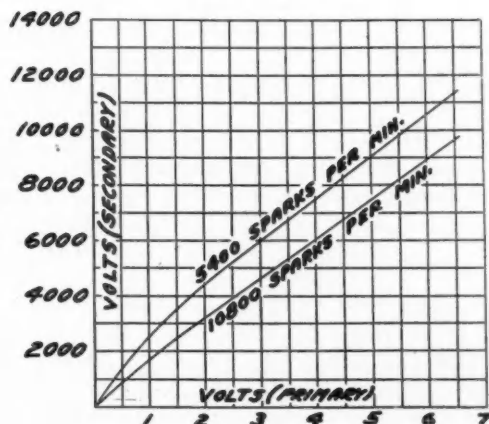


Fig. 1 — Effect of engine speed on operation of 6-volt coil

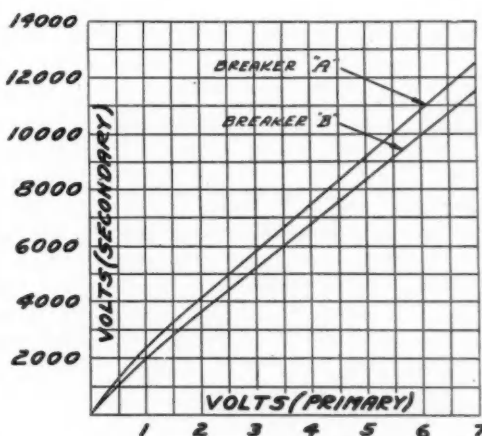


Fig. 2 — Secondary voltages with two different breakers on the same 6-volt coil at 10,800 sparks per min.

portant to know the principal factors affecting the secondary voltage of the coil. They are:

- Engine speed.
- Breaker point contact adjustment.
- Battery voltage.
- Conductance across secondary, due to plug fouling.
- Capacity between leads and ground.

(a) Engine speed controls the time of breaker contact, hence the amount of current flowing in the primary. (Fig. 1.)

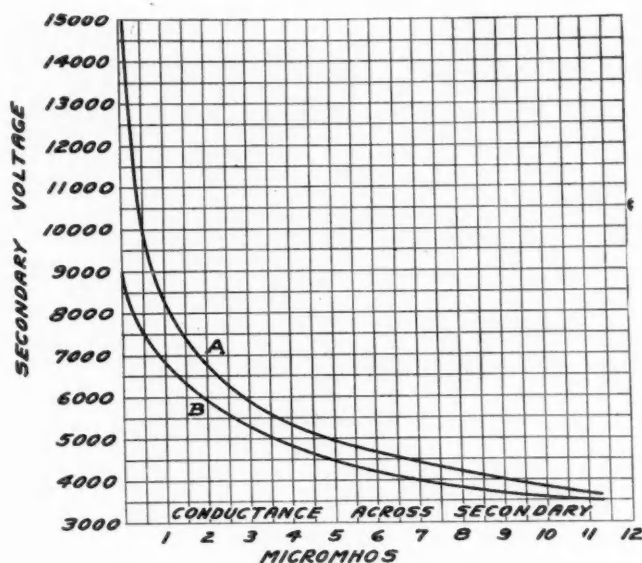


Fig. 3—Performance of coil with leakage in the secondary circuit at 1800 sparks per min. A, no capacity in secondary; B, 420 mmf. capacity across secondary

(b) The adjustment of the primary breaker contacts affects the amount of primary current delivered to the coil. This in turn, affects the secondary voltage. (Fig. 2.)

(c) Changes in primary voltage will likely occur under starting conditions when the drain on the battery is heavy. Figs. 1 and 2 also show the effect of primary voltage on secondary voltage.

(d) Electrical leakage across the coil secondary, due to plug fouling, lowers the secondary voltage. (Fig. 3.)

The effect of electrical leakage across the secondary on the performance of the coil is also modified by changes in the primary voltage. (Fig. 4.)

(e) In actual engine installation there is always present some electrical capacitance between the secondary leads and ground. The effect of this capacitance

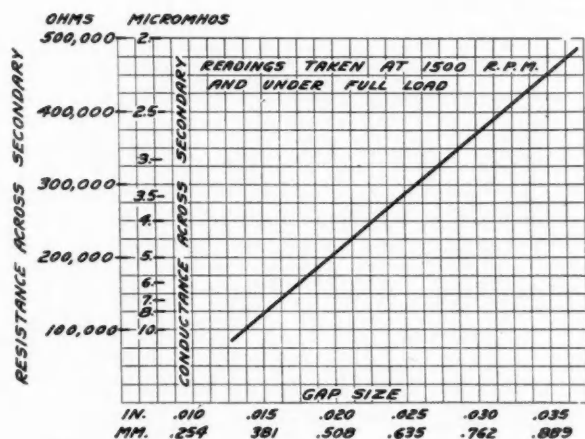


Fig. 4—Allowable secondary leakage (due to fouling of insulator) with different primary voltages

on the coil is seen in Figs. 3 and 5. In shielding the ignition system for prevention of radio interference this added loss may become serious.

The sparking voltage of the spark plug gap is affected mainly by the following factors:

- f. Gas density at the gap.
- g. Gap size.

- h. Electrode shapes.
- i. Electrode temperature.
- j. Electrode material.
- k. Electrode deterioration.

(f) The principal factors affecting the gas density at the gap are: Engine compression, air-fuel ratio, atmospheric humidity, barometric pressure, and gas turbulence.

Engine compression is a function of throttle opening, as well as of engine design. (Fig. 6.)

The air-fuel ratio depends on the carburetor adjustment and characteristics. Abnormally rich mixtures increase sparking voltages noticeably. (Fig. 7.)

Atmospheric humidity, barometric pressure and gas turbulence have a complex effect not only on the density of the mixture but also on the combustion temperature. These factors affect the sparking voltage from several angles and complicate the isolation of the causes involved. (Fig. 8.)

(g) Spark plug gap sizes affect the sparking voltage directly. (Fig. 9.)

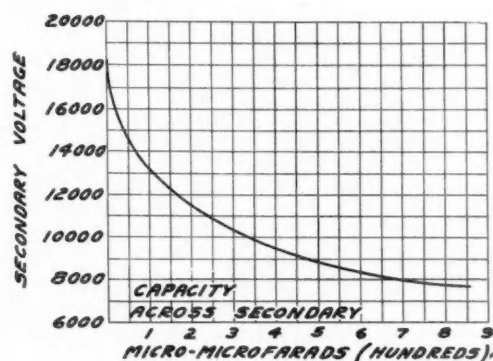


Fig. 5—Typical performance of a spark coil when the secondary is shunted by different capacities

When the width of the gap is increased, the sparking voltage required to jump the gap will increase. At this higher voltage the ignition system will not successfully withstand as much fouling of the insulator. (See Figs. 10 and 11.)

(h) The electrode shape has a relatively small effect on sparking voltage. Sharp edges or pointed electrodes in new plugs may slightly lower the sparking voltage, but after a few hours of engine run this slight advantage is lost. As the thin edge of the electrode becomes worn away, the gap widens and the sparking voltage required is higher than if the same plug had had an electrode of such shape that it would not have been changed greatly by the deterioration of sharp edges.

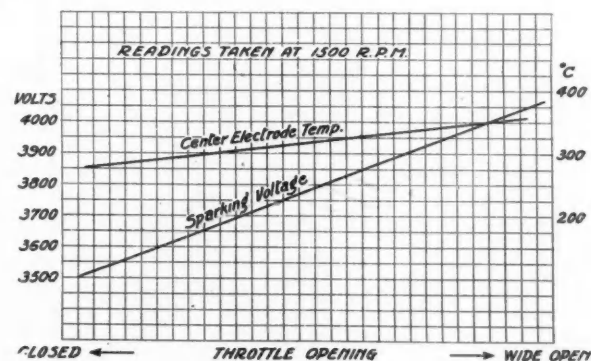


Fig. 6—Effect of throttle opening on sparking voltage

(Note that in spite of the rise in electrode temperature the sparking voltage rises rapidly)

(i) The effect of a change in electrode temperature is often overlooked, but the magnitude of this effect is so great that it is an important one. This effect is caused by an increase in the number of electrons emitted from the hot surface of the electrodes. (Fig. 12.)

The high sparking voltage required by a cold spark plug when starting a cold engine is usually increased by opening the throttle (increase of compression, see Fig. 6), but once the electrodes have reached the more normal operating temperature, the sparking voltage will be reduced.

For a better understanding of items j and k, it is necessary to deal briefly with the transient phenomena

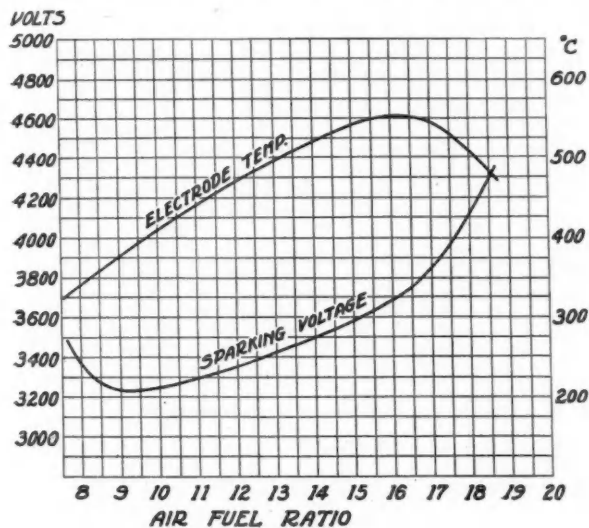


Fig. 7—Effect of mixture ratio on sparking voltage

of the ignition spark and with the methods of studying and recording them.

The spark jumps the gap because the gases become good electrical conductors, due to the presence of ions and free electrons. The varying number of ions and electrons present in the path of the spark cause variations which occur in the sparking voltage, and as most of these electrons are furnished by the electrode wire

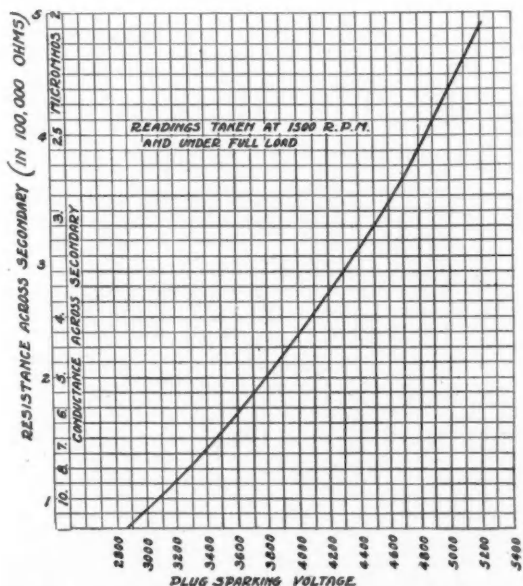


Fig. 10—Maximum permissible conductance as related to the voltage required to break down the spark gap

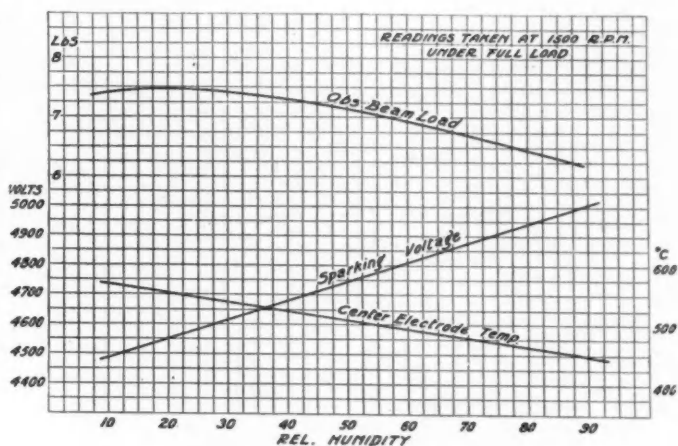


Fig. 8—Effect of atmospheric humidity on electrode temperature and sparking voltage

itself, the common theory that electrode material has no effect on sparking voltage does not hold true. This emission of electrons, due to the characteristics of the usual commercial electrode alloy, decreases with the life of the plug and causes a proportional increase in the sparking voltage required to break down the gap.

In the study of sparking voltages a cold cathode ray oscillograph has been used to give a visible record. This was developed in collaboration with O. S. Duffendack and R. A. Wolfe, of the department of Engineering Research, University of Michigan.

The schematic diagram (Fig. 13) shows the manner in which the cathode ray oscillograph operates. The

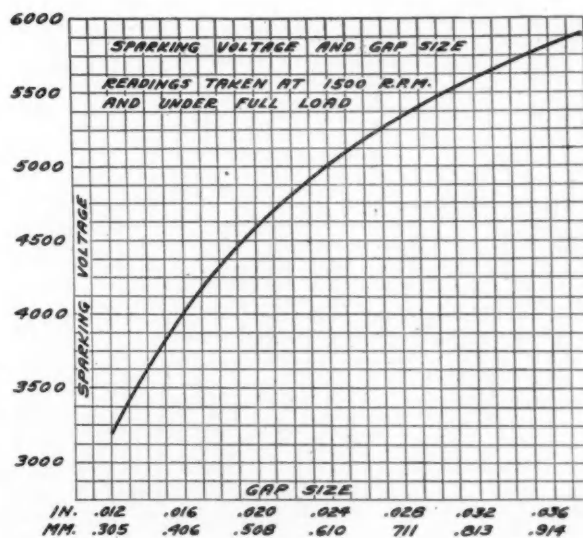


Fig. 9—Dependence of sparking voltage on length of gap

(These data were obtained on an engine of low compression ratio)

beam of electrons emitted by the plate of the cathode tube is represented by the dotted line. This beam passes through the anode, striking the photographic plate and leaving an image of a dot, as in Fig. 13A. The electron beam can be deflected either by the electrostatic field set up by the plates D in parallel with the spark plug, in which case it will leave an image of a line on the photographic plate, as Fig. 13B. The beam may also be deflected by the electro-magnetic field set up by the two coils E, which are inductively coupled to

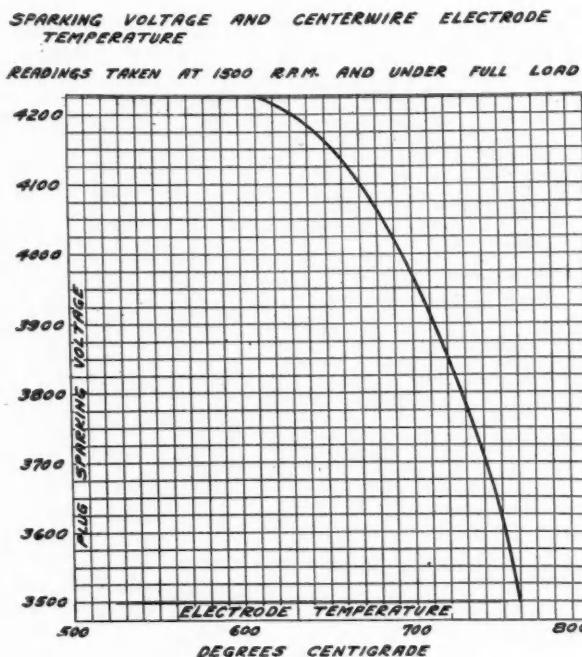
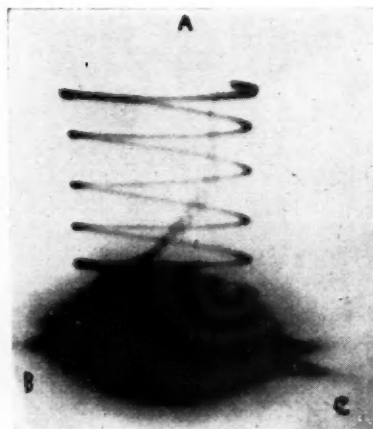


Fig. 12—Effect of electrode temperature on sparking voltage

a high frequency oscillator, the frequency of which is used as a time element. This leaves on the photographic plate a linear image, as in Fig. 13C, which represents half a cycle of the oscillating field. The frequency of the oscillator can be set as high as one million cycles per second, so that time intervals of one-ten-millionth of a second can be measured.

Fig. 14 shows the peak break-down voltage of a spark while igniting the mixture of an engine. A time frequency of 300,000 cycles per second was used in making

Fig. 14 — Cathode-ray oscillogram of breakdown voltage of a spark plug while operating in an engine



this record. At point A the spark plug sparked and ignition occurred. The distance from the base BC measures the voltage, and each complete cycle of the curve represents 1/300,000 of a second.

The synchronizer at the bottom of Fig. 13 controls the recording apparatus in such a manner that only one ignition spark at a time is picked up and recorded as in Fig. 14.

Observations made with this oscillograph supplement those made by less accurate means. It was found that the sparking voltage of a spark gap may vary as much as 50 per cent from one spark to the next. (Fig. 16.) This explains why intermittent missing is first en-

countered as the spark plug begins to fail as the result of the accumulation of a shunting carbon deposit.

After a further study of this variation in sparking voltage, which is attributed to varying quantity and positions of the free ions and electrons in the gap, it was found that this variation could be practically eliminated by the use of a new electrode material giving off electrons much more easily. The sparking voltage of a gap is also substantially reduced by employing this electrode alloy.

(j) The voltage varies widely from one spark to the next in the case of the commercial alloy, but remains practically constant with the AC alloy. (Table 1.) To better designate this highly desirable property of the electrode alloy, the new AC wire is named "Isovolt."

(k) Deterioration of the electrode alloy is of two distinct kinds: One is decrease in the electronic emission due to the fact that the electron emitting material

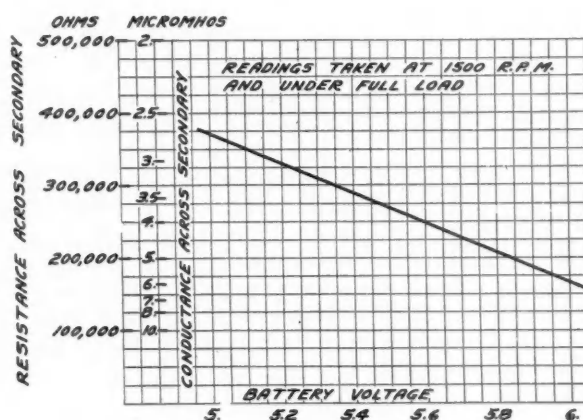
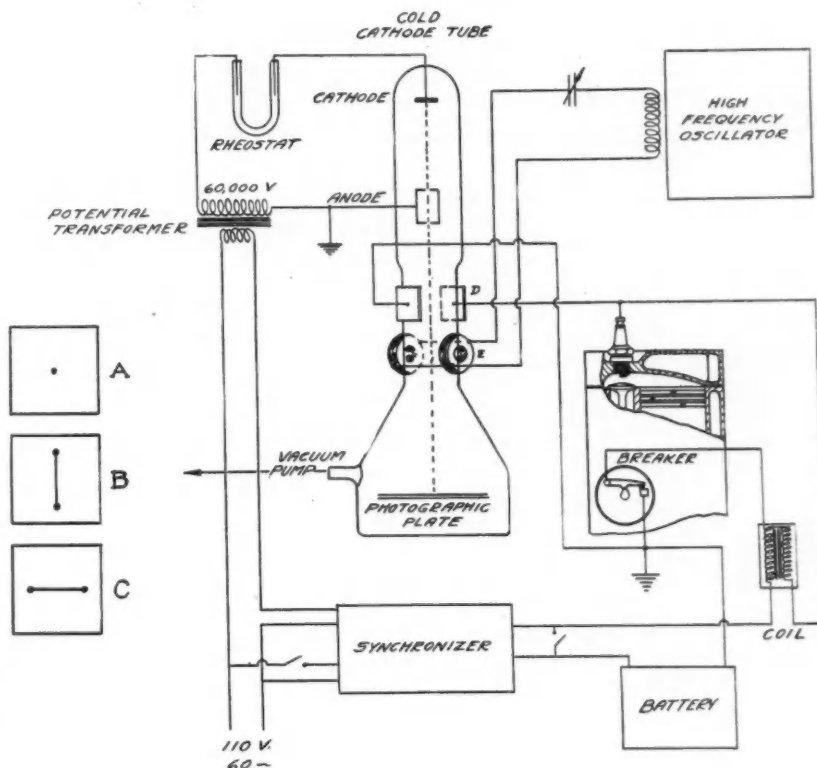


Fig. 13 — Diagram of a cathode-ray oscillograph connected to engine for recording ignition phenomena

tion of the wire—is due to the action of combustion gases always accentuated at high temperatures. (Fig. 15.) The sulphur in gasolines, for example, attacks the inter-crystalline structure of the wire, causing the individual crystals to loosen and eventually, under the action of the spark or concussion, they will become detached, thus causing visible corrosion. Such wear

causes the gap to widen, and consequently further raises the sparking voltage. The new AC electrode alloy requires a lower sparking voltage than any commercial electrode wire with similar electrode shapes and gap width, and also better withstands the action of inter-crystalline corrosion. It retains the same sparking voltage throughout its life, regardless of the amount of corrosion produced by the gases, assuming that the spark plug gap width is kept constant.



Considering that the above data were obtained with the best ignition systems on the market and that many others are not as efficient, the reduction in sparking voltage effected by the new Isovolt alloy is a decided improvement in spark plug quality.

The greater uniformity and reduction in sparking voltage effected by this new electrode material will assure longer life for the plug and wider temperature range of satisfactory operation, because a greater degree of fouling may be accumulated before ignition missing occurs.

Tests show that easier starting in cold weather is also definitely obtained. Plugs can be run longer in the engine without regapping because of the greater resistance to corrosion from hot gases.

To minimize spark plug missing, the following points are recommended:

1. Small spark gap from .015 to .018 in. in high compression engines and from .018 to .022 in.

(Continued on page 99)

TABLE NO. 1—COMPARISON OF SPARKING VOLTAGES

Sparking voltages of sparks across a spark plug having "Isovolt" electrode wire and .100 in. gap.

Measured in air
Volts

4935	5040	5040	5040
5040	5040	5040	5040
5040	5145	5250	5250
5355	5355		

Average 5115 volts

Maximum deviation from mean 240 volts.

Total deviation 420 volts

Sparking voltages of sparks across a spark plug having regular electrode wire and .100 in. gap.

Measured in air
Volts

4200	4200	5250	5250
5460	5670	5670	5880
5880	5880	6090	6090
6300	6720		

Average 5610 volts

Maximum deviation from mean 1110 volts.

Total deviation 2520 volts

Sparking voltages of sparks across a spark plug having "Isovolt" Electrode wire and .020 in. gap. Measured under regular engine conditions.

Volts

3570	3780	3780	3780
3780	3780	3780	3780
3780	3780	3990	4200
4200	4200		

Average 3870 volts

Maximum deviation from mean 330 volts.

Total deviation 630 volts

Sparking voltages of sparks across a spark plug having regular electrode wire and .020 in. gap. Measured under regular engine conditions.

Volts

3570	3570	3780	3780
3990	4200	4200	4410
4410	4410	4620	4830
5880	5880		

Average 4395 volts

Maximum deviation from mean 1485 volts.

Total deviation 2310 volts

Future Solution of Economic Problem Depends Upon Cooperative Effort

Reduction in tomorrow's costs are sure to reflect a closer liaison between engineers and plant executives. Tool design to play an important part.

TOMORROW should see greater progress in those manufacturing details that mark the difference between a satisfactory job and a lot of trouble. If we were to look for a keynote for the attitude of the production man of tomorrow toward his job, that should come pretty close to the mark. How are we to differentiate him from the production man of today and yesterday? Whether executive or machine tool operator, he will probably face the same basic problem—to produce more dollar value per dollar of cost. The fundamentals of his job therefore remain fairly constant.

The tools that are given him, and the conditions surrounding their use may, and undoubtedly will, continue to change. He will have to adapt himself to these changing conditions and assist in their development. But in this he does not differ from the production man of today or yesterday. His greatest opportunity for progress we can find in our shops today.

During the past few years there has been a tendency for many a production executive who has been in the business for some time, to look back on the startling progress made within the last decade and say to himself, "We have arrived, we have brought production costs as low as we possibly can with the tools with which

we have to work. It is now up to distribution to further lower our costs to the consumer." To this he may add: "Of course, if someone comes along with a new machine which will cut our costs some more, we will take advantage of it!"

But he can do many things to bring his costs down further; many things in which past and present experiences indicate possibilities of considerable improvement. His problems are manifold: men and materials, machine tools and handling methods, small tools, inventory and buying control, flexibility and engineering design. Surely we cannot have reached the ultimate in all of these.

Probably the most vital factor in an efficient production organization is the personnel. Tomorrow's production leaders, great or small, all down the line must be imbued with the idea of searching for likely men among those working under them. The training of men for increasing responsibility is more properly one for the whole executive organization than for apprentice systems and courses of training in specialized schools or departments. Once the conviction really can be driven home that the prosperity of the firm and all those connected with it depends primarily on the men who help operate it, a big gain will be made toward economical production.

Every group leader, from the factory foreman to the highest production executive, should be searching for a successor in his job, and, having made his choice, take pains to develop the junior man. He need not, in an intelligently managed firm, have much fear of a good subordinate working him out of a job, since he himself will pick and train his man and have his department so well organized that he can step out and up when the chance comes. That chance will be the quicker in coming for the good judgment he has shown.

Equipment, which in the automotive and allied industries has been the subject of greatest attention from the production executive's angle, consists mainly of three classes, machine tools, small tools and material handling devices. The last named are more subject to individual designing to meet a specific need, so that generalities on their design and what tomorrow's production man can do to improve them, do not apply. Of course, the tremendous importance of conveyors and kindred mechanisms can scarcely be over-stated. Process operations in themselves have been so refined and concentrated of late years that the handling of materials and parts requires a force of men almost comparable to the number of productive operators where mechanical handling is not utilized.

E. S. Chapman

AFTER leaving the University of Wisconsin in 1916, E. S. Chapman became employed by the Gisholt Machine Co. of Madison, Wis., first as apprentice machinist and later through all branches of the machine shop for about two and a half years. Later employed in the company's general offices from telegraph and mail clerk to assistant to the general manager, and assistant general sales manager, a position he resigned to join the Chrysler Corp., Nov. 1st, 1928.

On joining the Chrysler Corp., he was first engaged in special work for K. T. Keller, at that time vice-president of the Chrysler Corp. and general manager of Dodge Bros. This work included a study of allocation of machinery and equipment, liquidation of a considerable surplus of obsolete equipment, special investigating work. Later, he was made acting staff mechanic, supervising all capital expenditures for production. In the latter part of August, 1929, he became operating manager of the Chrysler plant at Newcastle, Ind., which up to that time was operated as a subsidiary of the Chrysler Highland Park Plant. The Newcastle plant is now an independent unit of the Chrysler Corp.

duction Problems

By E. S. CHAPMAN

Operating Manager, Newcastle Plant,
Chrysler Corp.

The flow of materials, parts and products from the receiving dock to the shipping door is becoming an even more vital cost phase of production. Demand for variety characterizes today's market. It may well become more pronounced tomorrow. Men, methods and equipment must be developed to keep materials continually in motion, in spite of increasing variation, as in design and color of the finished product. The modern automobile plant is often required to schedule and ship several hundred modifications of five to 10 body and chassis models. Options in colors, wheel equipment, bodies and accessories, will continue to multiply. Greater flexibility of material and parts control will have to be provided. Ingenious conveyor layouts, better delivery service from vendors and closer control of sources of supply will all contribute to the desired end of minimum inventories, less damage through storage and handling, the conservation of floor space and uninterrupted output.

Forge and foundry shops are the most outstanding examples. Material handling methods in these departments have lagged behind. They form a major problem for tomorrow's production man. A study of mechanical handling in some departments of a modern steel mill might point the way for him.

Small tools often spell the difference between a good job and a lot of trouble. Their excellence varies too much with the designers. This includes the special tool equipment generally furnished with high production machine tools. Tomorrow should find a greater readiness on the part of the supplier to acknowledge to himself and his customer the limitations of an operation on which he is quoting. Greater size and strength in tool bits is indicated as necessary. Tomorrow's production men will make better provision for getting cutting fluids to the points of cutting and better provision for chip clearance.

Few industries are more interdependent than motor cars and machine tools. The progress to be expected in this class of equipment will likely follow along the lines of recent history. Tomorrow's production men, however, should place greater stress on dependability and endurance. Power to produce is, of course, vital. High output has come to be expected of modern machine tools. In this it closely follows the ability of cutting tools to withstand a higher rate of material removal. Over this the production man has but little control. His ideal is and will be the machine tool which is free from trouble. The days of the oil-can are numbered. The lathe or miller of tomorrow should have centralized lubrication. Where possible oiling should be automatic; it should begin when the operator starts the machine and stop when he stops it. Insufficient lubrication is



E. S. Chapman

the major cause of waste and results from leaving the oiling to the operator.

Freedom from oiling cares should also lead the production man of tomorrow to wider use of anti-friction bearings. They contribute long life and are readily replaced. Hardened steel surfaces on ways sometimes double the active life of a machine and their application will probably become more general.

The multiple spindle machine of tomorrow should be less crowded in design for strength of spindles and shafts, and for more effective tooling. We have come to expect much of machine tool designers, in spite of the fact that considerable rule of thumb designing still remains in some machine tool plants. Modern equipment now provides for getting about all the tools around a piece of work that good practice warrants. Tomorrow's improvements in the main, rather than startling new methods, are likely to be reflected in greater reliability and endurance.

Apart from the physical aspect of the production job and as fundamental to considerations of cost in relation to any specific factor, is cooperation between the designing and producing departments. The development of a spirit of cordial entente between engineering and production departments is marked today. It will become more so tomorrow. Suggestions of inestimable value on details of design for economical machine or heat-treating or material specifications and the possibility of using common parts on various models are available in the manufacturing personnel in such a rich fund that tomorrow's costs are sure to reflect a closer liaison between the engineer and the production man of the future. Too often today and more often in the past, antagonism has taken the place of cooperation.

Curtiss Tanager, Judged the Safest Was Designed to Meet Production

*Airplane was only entrant to qualify
mittee in charge. Floating aileron
are features of construc*

By A. B.

WINNER of the \$100,000 prize given by the Daniel Guggenheim Fund for the Promotion of Aeronautics in its Safe Aircraft Contest, and only qualifying entrant in that contest, the Tanager, designed and built by the Curtiss Aeroplane & Motor Co., has received recognition as the world's safest airplane.

In order even to qualify as an entrant for this prize, this plane had to meet certain rigid conditions set by the committee in charge of the contest. While there was some discussion in aeronautical circles as to whether these tests covered the proper qualifications for a practical and safe airplane, they were drawn up by a well-chosen committee, and were the result of much careful consideration. These tests require a wide range of flying speeds, assure that the plane will almost fly itself and are very specific as to ability to land and take off in small areas. They are outlined by fund officials as follows:

1. The aircraft must maintain level and controlled flight at a speed not greater than 35 m.p.h. and must be able to glide for three minutes with all power switched

off at a speed not to exceed 38 m.p.h., the demonstration glide being of at least three minutes' duration.

2. The aircraft must come to a complete stop within 100 ft. of the spot where it first touches the ground in landing.

3. A steady glide must be made over an obstruction 35 ft. high and the aircraft must come to a complete stop within 300 ft. of the base of the obstruction. This is to test the ship's ability to make a forced landing in a small space surrounded by wires, houses or trees.

4. The aircraft must take off after not more than a 300-ft. start along the ground and must then clear an obstruction 35 ft. high and 500 ft. from the starting point.

5. To test its ability to approach an uncertain landing place in event of engine failure, the aircraft, with all power switched off, must glide at an angle of not more than 8 deg. to the horizon, and must also be able to glide at an angle of more than 12 deg. to the horizon at a speed not greater than 45 m.p.h.

6. In normal flight, at a speed of 45 to 100 m.p.h. the pilot must take both hands off the controls, leaving them entirely free for at least five minutes to demonstrate the ability of his craft to right itself after disturbances from wind gusts or from the application of controls.

7. The aircraft must show that if the engine suddenly fails on a steep climb, no abnormal attitude, such as a stall followed by a nose dive, will result and that the craft will descend on a steady easy glide without intervention by the pilot. A frequent error following engine failure is the pilot's tendency to pull back on his controls instead of nosing down the craft into a glide. The aircraft must demonstrate that it is fool-proof against such an error, and one of the tests requires that the power shall be switched off on the climb, the elevator control pulled back toward its maximum extent and that the craft shall, under such conditions, descend on a steep glide at a speed of not more than 40 m.p.h., and under perfect control.

8. The ship must be provided with three controls, which are independently effective about corresponding axes of the aircraft at all altitudes.

9. The aircraft must show its ability to take off and to land on a plot 500 ft. square



The Curtiss Tanager, winner of the Daniel Guggenheim Fund prize for safety in aeronautics. Note the floating aileron on the lower wing assembly

Aircraft in Guggenheim Contest, Requirements With Few Changes

under rigid conditions set by commons and automatic wing slots tion, original in design.

CROFOOT

surrounded by a 25-ft. obstruction. To test this properly, a portion of the field will be marked off, and four observers, placed 25 ft. above the ground, will sight across the boundaries of the plot. After the craft has left the ground, the observer will switch off the engine when he pleases and the pilot will land the craft within the square without passing through the imaginary obstruction. The test will demonstrate the ability of the craft to use restricted territory with bad approaches. The aircraft must be able to taxi under its own power in any direction in a wind whose mean speed is at least 20 m.p.h.

The Tanager was designed so that it could be placed in production with a minimum of changes and with a slight change in the ordinary engineering practice. It was developed at the experimental plant of the company at Garden City, as described in *Automotive Industries* a few weeks ago.

Basically, the Tanager is a three-place cabin biplane, departing from conventional biplane design by the addition of three safety devices, namely: A floating aileron, automatic wing slots and controllable wing flaps.

The floating aileron, which is a distinct Curtiss development, differs from all other ailerons in that it at all times assumes automatically a position parallel to the air currents set up by the motion of the plane in flight. The aileron is mounted on the tip of the lower wing where it operates in air undisturbed by the wings and where its operation does not disturb the lifting characteristic of the wings. The upper and lower surfaces of the aileron are identical so

that it has no lift unless presented to the wind at an angle. It is balanced aerodynamically by placing the axis aft of the landing edge.

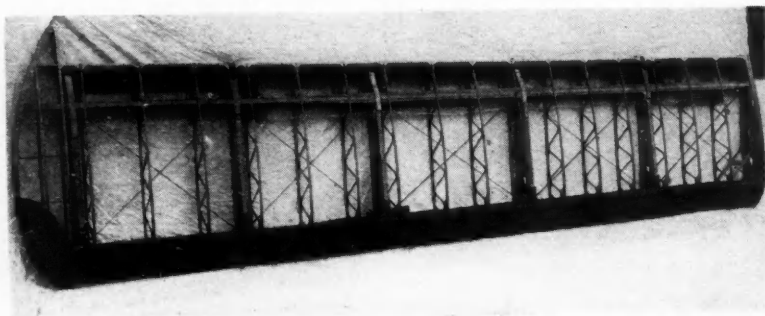
The aileron "floats" at all times, whether the controls are being used or not. When the controls are in neutral, the aileron is parallel with the direction of the wing. If the controls are moved to create a 10-deg. angle, for example, one aileron will be up 5 deg. from the relative wind and the other one down 5 deg., so that the ailerons operate with respect to themselves rather than with respect to the wing. In this manner effective aileron control is obtained,



R. R. Osborne, project engineer at the Curtiss Aeroplane & Motor Co. plant at Garden City, under whose direction the Tanager was built



Front view of the Curtiss Tanager, awarded the \$100,000 prize given by the Daniel Guggenheim Fund for the Promotion of Aeronautics in its Safe Aircraft Contest



Left upper outer wing of the Curtiss Tanager, showing the alclad rib construction and tip control

whether the ship is in normal flying position or in stalled position. The maximum displacement is 15 deg. from the wind direction.

The up-and-down lift is, therefore, equal, and the drags on each side of the airplane are also equal. Therefore, when the ship is rolled, no corrective rudder is needed.

Because the ailerons float into the wind and follow the flight path of the ship at all times, regardless of the attitude of the ship, it is evident that the control is the same at the stall as it is at high speed and that no rudder is required throughout the range. The Tanager can be flown in tight vertical banks and through all normal flying maneuvers without control of the rudder—entirely by ailerons and elevators; and, when completely stalled, the ship can be rolled from one side to another with only slight yawing tendencies, which are in the proper direction.

The wing tip of the lower wing fairs into the aileron section at high speed, giving very clean installation from the viewpoint of streamlining. The control which operates this aileron is as simple as a normal aileron control and imposes no increased loads on the stick.

Slot control is automatic, a new type of roller support having been developed in order to have this mechanism operate at its smoothest. It is adjusted so that all slots over the span open simultaneously. The slots start opening at about 12 deg. angle of attack and open gradually to their maximum position at 16 deg. angle of attack. They are provided with buffers so that there is no sudden opening or jar in the ship caused by the operation of the slot.

The flaps in the back of the wings are operated by a crank in the cockpit, this being the only added control in this plane. The ends of the flaps are provided with cloth shields which come into operation when the flap is down, reducing the tip vortices or air disturbances at the ends of the flaps. The flap control does not require any great effort on the part of the pilot to operate, nor does it add any load to the control system in either neutral or pulled down position.

The flaps have a small slot open at all times just in front of them, which prevents the flaps from stalling and burbling at the high angles necessary for maximum lift. The wing arrangement was developed after two years of research in the Curtiss wind tunnel. With flaps in normal position and slots closed, which condition prevails in all normal flying, the normal Curtiss 72 wing section is obtained and the slot mechanism has no protruding parts. There is a small slot in front of the rear flap.

The plane is equipped with oleo and rubber tube landing gear and has twice the normal give for a plane of its weight. In taxiing position, the wheels appear to be dished in at the top, due to their large vertical travel. In landing they are nearly vertical.

The Tanager has been landed repeatedly from a height of 200 ft. by rolling the stabilizer all the way tail heavy, pulling the stick all the way back and holding this position until the landing is effected.

The plane is powered with a stock Curtiss Challenger, 176 hp. air-cooled, 6-cyl. engine.

The wing beams are of wood and are box spars. The ribs are of wood and are normal in construction. The whole wing is covered with cloth, as is all of the airplane. The drag struts are also of wood and are of box section. There is a single drag truss of wood struts and steel wires. The fittings and hinges are of combined high tensile steel and Dural.

The inner plane struts are of streamline Dural tubing and steel streamline wires are used.

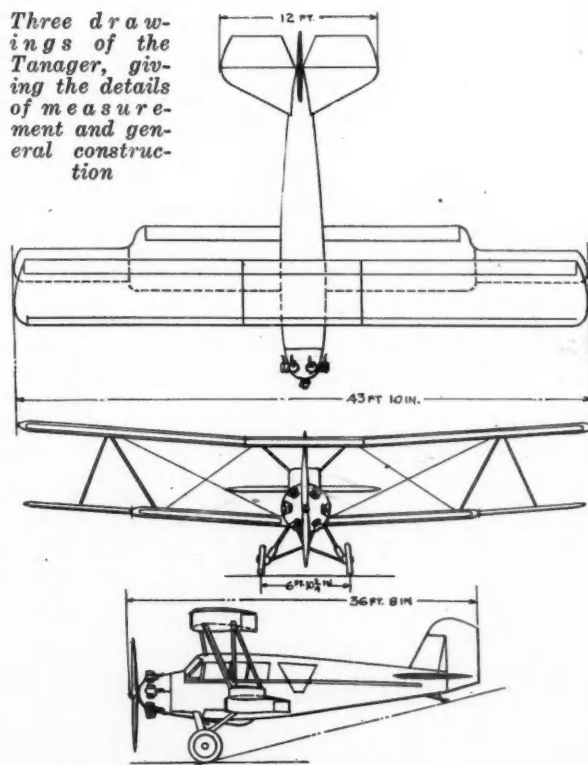
The cabin frame is constructed mostly of wood on the experimental ship, but, of course, metal would be used in production. The cabin seats three people in a single row. The front two seats are provided with dual control for the purposes of the competition. The space normally occupied by the third seat contained a box for carrying ballast during the tests. Excellent ventilation is provided by windows all around which can be rolled down out of the way for landing if the pilot so desires. The seats are fitted for the wearing of parachutes. The doors open with the hinges at the top which, we believe, will be a safer door in an emergency.

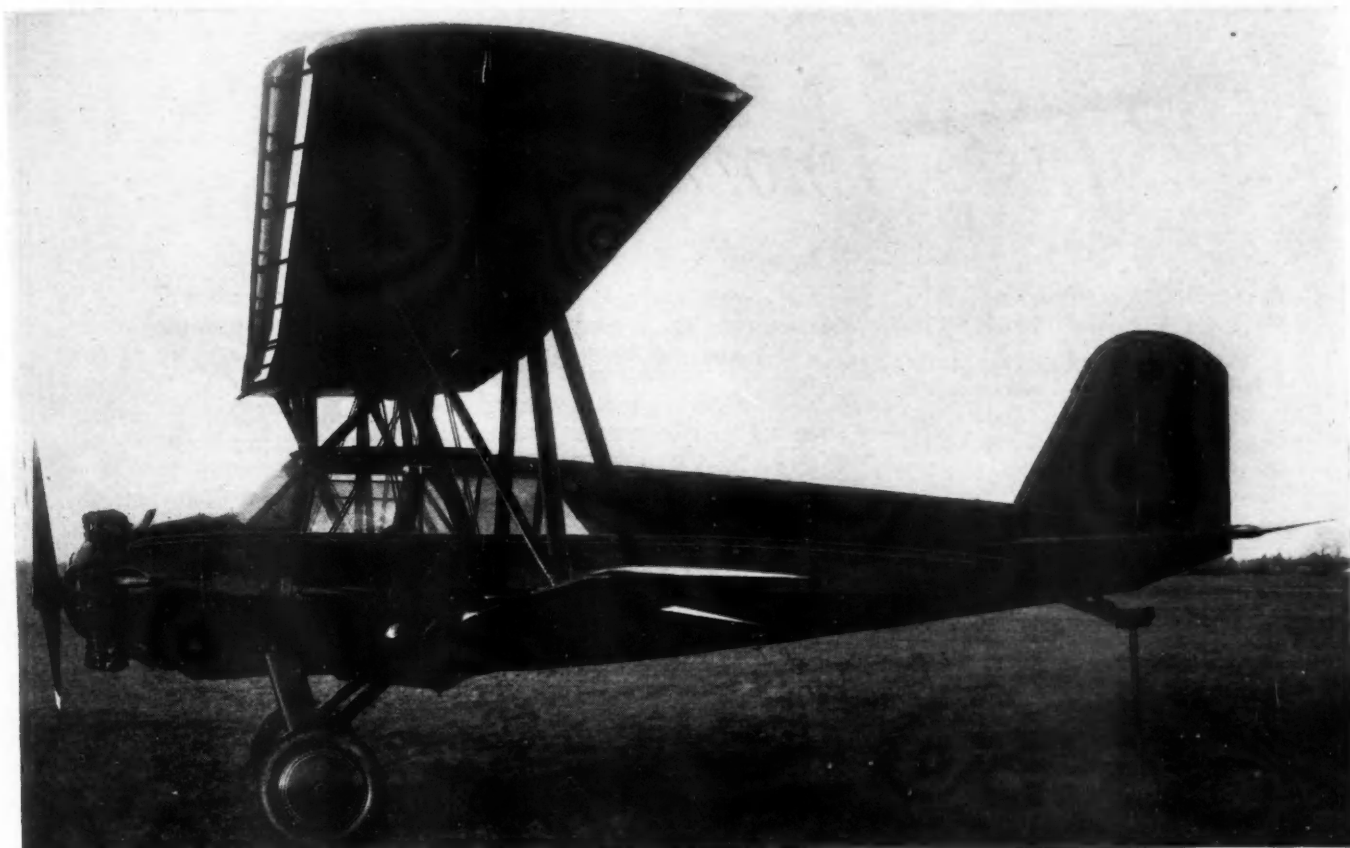
Gasoline tanks are two in number and are interconnected. There is a side tank on the left of the ship which is connected to a bottom tank in the same section of the fuselage. There is a wobble pump available for the pilot as well as an engine fuel pump. The oil tank is on the right side of the ship and forms part of the cowling as do also the fuel tanks.

In commenting on the results of the competition, Frank H. Russell, vice-president of the Curtiss Aeroplane & Motor Co., said:

"We are of course gratified that we have been declared winners of the competition, but far more important than

Three drawings of the Tanager, giving the details of measurement and general construction





The Tanager with the wing slots in the leading edge of the upper wing opened

our own reaction is the effect of the competition on the industry and the public at large. The public, during the past few years, has shown a constantly increasing interest in aviation, but its attention has, perhaps, too often been drawn to aviation by spectacular achievements. We feel that the Guggenheim Fund deserves congratulations from the entire industry and the public, not only for providing such a splendid stimulus for the development of a safer aircraft, but for bringing into the public consciousness a realization of the progress that has been made.

"Summarizing, we have produced in the Tanager an airplane built in accordance with Department of

Commerce requirements, possessing normal speed and load characteristics, powered with the Challenger engine, holder of the world's record for endurance, and one which in addition, will not spin and which

can be landed and operated safely even under the most unfavorable field conditions, without an unusual degree of skill on the part of the pilot. In maintaining Curtiss-Wright standards of safety, the design features of the Tanager will be incorporated as rapidly as possible in standard types of Curtiss-Wright aircraft."

An announcement of the presentation of the Guggenheim award to the Curtiss plane was made in Automotive Industries last week.

Tanager Characteristics

Wing loading (lb. sq. ft.)	8.5	Vertical tail	20.4 sq. ft.
Power loading (lb. hp.)	16.1	Elevators	23.4 sq. ft.
Aerofoil section,		Rudders	14.1 sq. ft.
Curtiss C-72 (wing, slot and flap)		Engine	Curtiss Challenger
Load factor	7	Horsepower	176 at 1800 r.p.m.
Length	26 ft. 8 in.	Fuel consumption, full throttle,	89.3 lb. p. hr.
Height	11 ft. 4 in.	Oil consumption, full throttle,	3.4 lb. p. hr.
Span	43 ft. 10 in.	Fuel capacity	57.5 gal.
Chord, upper	60 in.	Oil capacity	3 gal.
Lower	60 in.	Propeller make	Hamilton (wood)
Mean aerodynamic chord	60 in.	Propeller dia.	8 ft. 4 1/2 in.
Gap	69 in.	Cooling	Air cooled
Stagger at leading edge	29 1/2 in.	Weight, empty	1959 lb.
Incidence, upper	-2 deg.	For the Guggenheim Competition	
Lower	-2 deg.	Useful load	882 lb.
Dihedral, upper	4 deg.	Pilot and observer	370 lb.
Lower	4 deg.	Fuel and oil	359 lb.
Sweepback, upper	0 deg.	Equipment	68 lb.
Lower	0 deg.	Ballast	85 lb.
Wing area, including flaps	333 sq. ft.	Gross weight	2841 lb.
Ailerons	45 sq. ft.		
Horizontal tail	47.6 sq. ft.		

Performance

(Figures based on Guggenheim Competition Requirements and Curtiss preliminary tests).

High speed (m.p.h.)	110	Endurance, full throttle (hrs.)	3.6
Minimum speed (m.p.h.)	35	Range, full throttle (miles)	405
Rate of climb (ft. p. min.),		Service ceiling (ft.)	12,500
600 (sea level)		Absolute ceiling (ft.)	15,000

Just Among Ourselves

Factory-Dealer Programs Have an Economic Basis

EXECUTIVES of a great many passenger car companies really are concerned about the financial progress of their dealer organizations as 1930 starts. There has been a great deal of conversation about change in manufacturer-dealer relationships this year. After a week at the New York Show spent in talking with numerous executives and attending many dealer luncheon and dinner meetings, we are strongly of the belief that this change actually is taking place; that it is far from being all conversation.

Economic, rather than abstract ethical considerations, are bringing the change about. "If the factories don't make it possible for a majority of their dealers to get adequate returns on their investments in 1930," the chief sales executive of one successful company said informally, "we are going to find ourselves five years hence with the whole financial and operating burden of distribution right on our own shoulders."

There is general concern about the attitude of the average small-town banker toward automotive retail accounts and toward establishment of new car agencies.

And it is generally agreed that a really profitable year for a majority of dealers will do more to dispel economic bogies than will 10 shiploads of propaganda and publicity protests about the soundness of our industry.

* * *

Less Factless Oratory And More Work in Prospect

ABASIC change in factory attitude was reflected clearly in a majority of the speeches made to gatherings of dealers during New York Show week this year. We find one factory sales executive standing up be-

fore his dealers and telling them that they must cut down their used car losses, no matter what else happens, coupling with that exhortation the statement that the factory will be content with whatever volume the retailers can get while operating on a sound trading policy. We find another factory leader saying to his dealers that 1930 probably will equal 1928 in volume.

Throughout the meetings the idea was emphasized that much harder work will be required in 1930 than in 1929 to produce anything like the same volume.

Dealer meetings at the New York Show this year were characterized by less table pounding, less ballyhoo, less factless oratory than any similar gatherings in the recollection of this scribe.

A general realization seemed to be abroad that we are facing definite economic facts as the year 1930 opens. That recognition in itself augurs well for both manufacturer and dealer success this year.

* * *

Export Stocks Carried Over May Affect 1930 Output

INCIDENTALLY we are inclined to modify slightly the estimate of 4,985,000 total motor vehicle output for 1930 made in these pages a few weeks ago. Later research into the export situation indicates the existence of relatively high stocks of cars at a number of foreign points as the year opens. The export outlook seems very bright, but absorption of present stocks may hold production to slightly lower levels than those predicted.

Motor truck stocks abroad, it would appear, are not as high relatively as passenger car stocks at this time.

In any case we don't see how total car and truck output can fall much below 4,750,000 nor go much above 5,000,000 in the 12-month period just started.

"Sound Management Will Win Next Year's Rewards"

GEORGE GRAHAM, vice-president, Willys-Overland, Inc., voiced a number of sound as well as inspiring ideas in his talk at the banquet of the National Automobile Chamber of Commerce this year. His talk is history now. One paragraph from it we want to reprint here, however, because it expresses so clearly the present automotive situation as we see it:

"For a generation," Mr. Graham said, "we have been privileged to introduce a medium of individual transportation which the world had awaited for centuries. We must not be bound to past methods. We must be facile to meet new developments with new ideas. We must temper our courage with judgment and our optimism with common sense."

"Opportunities still beckon us. The possibilities continue to be infinite, but the rewards in 1930 will go to sound management."

* * *

All Paraphrase Hoover's Injunction—To W-O-R-K

MR. GRAHAM was billed as a keynote speaker. He fulfilled that function marvelously. The statement quoted above—"the rewards in 1930 will go to sound management"—for example, was characteristic of the type of thought which manufacturers were emphasizing to their retailers all through the week. Factory slogans are quite different from those of recent years. Studebaker says "1930 will reward fighters." Marmon urges "Watch Marmon in 1930—Safe and Sound." Similar paraphrases of Mr. Hoover's injunction to W-O-R-K were common throughout the week. On such a foundation it seems certain that success cannot fail to be built this year.—N. G. S.

Holley Aviation Carburetors Cover Wide Range

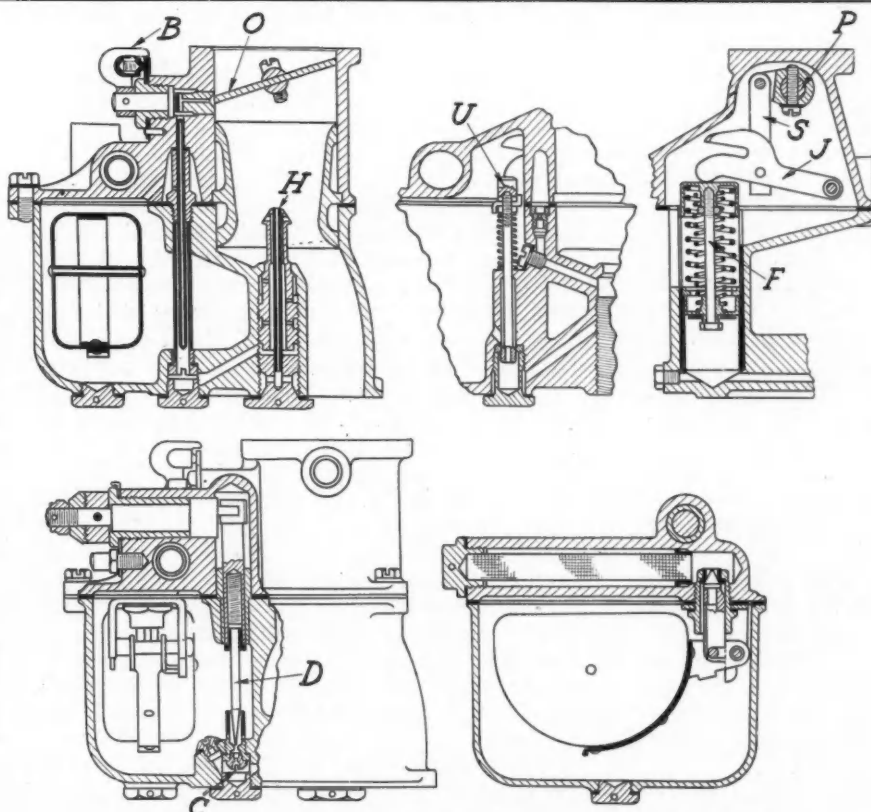
Model 419 for 100 to 160 hp. engines is announced. The line will eventually include units for powerplants of from 60 to 600 hp., of downdraft, updraft and horizontal types.

THE first of a line of aviation carburetors, which will eventually cover the range of 60 to 600 hp., both updraft, downdraft and horizontal, is being announced by the Holley Carburetor Company, Detroit. The Model 419 designed for engines developing 100 to 160 hp. has been approved by the U. S. Government aviation sections. Unusual features include an accelerating pump inclosed within the carburetor and a very accessible self-cleaning fuel strainer.

Instead of being near the base of the float chamber, the fuel screen, which is of cylindrical form, is located above the fuel chamber and easily accessible in the installed position, an especially advantageous feature for radial engines, since it does not require removal of the air-horn. The screen itself is provided with a flange at the inner end. When the screen is withdrawn, this flange scrapes any deposited dirt from the walls of the



The Holley Model 419 carburetor, with inclosed, throttle-controlled accelerating pump



Section drawings of details of the Holley aviation carburetor

screen housing. Fuel flows helically over the outside of the screen, and through it into the float valve chamber.

The carburetor is of the plain tube design, provided with a throttle-controlled accelerating pump, and power jet for full throttle operation. Control of the mixture at idling speeds is obtained by the provision of an eccentrically-mounted idling jet opposite the throttle valve *O* in its closed position. By means of an external lever and quadrant *B* position of the idle jet with relation to the butterfly edge can be changed, thus decreasing or increasing the suction on the orifice.

A forked lever *J* is connected to the throttle valve shaft *P* through a link *S*. One of the forks operates

the accelerating pump piston *F*, and the other, coming into action near the end of the throttle travel, opens the power jet *U*, and thus enriches the mixture. Both power jet and accelerating pump *H* in an upward direction.

The accelerating pump *F* is of the time-element (delayed-injection) type. The piston of the pump is connected to the piston rod through a coil spring, and is so arranged that a sudden opening of the throttle compresses this spring and then the piston continues to discharge fuel for from two to five seconds, depending upon the requirements of the engine.

When the power jet valve *U* is opened by the forked lever, additional fuel flows through a separate passage into the discharge nozzle. The main air bleed passage connects into the discharge nozzle *H* near its top. The air bleed is of the fixed jet type, set at the factory. In-

creases in jet size will lean the fuel mixture.

A separate mixture control needle valve *D* is provided for changing mixture ratios with increased altitude. This needle valve is provided with a spring to take up the pressure when the mixture control is pulled to "full lean" and the valve is closed.

A jet for minimum (lean) fuel supply when the mixture control is set in "full lean" is provided. This jet is adjacent to the lower end of the low-speed tube which insures positive idling at all times. For extremely cold weather, the main jet (located below the altitude control needle seat *C*) can be changed to a larger size to supply a richer mixture when such adjustment is necessary.

For correct float setting the line on the pivoted float should be 15/32 in. below the bottom of the float chamber cover.

Bucciali Front Drive Car

(Continued from page 75)

The front wheels being independently sprung, there is no front axle, properly speaking. The steering heads are supported from the frame by parallel links, with the result that the plane of the wheel always remains vertical. The upper member of this parallel linkage is formed by a trumpet or flared tube with spherical ends, which surrounds the axle shaft and is mounted in sockets in the transmission housing and in the steering knuckle. The lower members of the parallel linkage extend from the bottom of the transmission housing to the lower part of the knuckles. The load of the front end of the chassis is transferred to the wheels through a transverse semi-elliptic spring below the lower members of the parallelogram. However, the suspension system comprises, in addition to this semi-elliptic spring, a so-called compensator which consists of a horizontal cylindrical chamber above the transmission housing in which there are two pistons located between rubber disks of special shape to increase their deformability. These pistons connect by links to the ends of arms extending upwardly at an angle from the trumpets or flared tubes surrounding the axle shafts. The rubber disks evidently have a damping action, and it is claimed for them that they will give excellent service for years without the least attention.

Each of the steering knuckles is independently connected by its own drag link to the steering gear, and no tie rod is used. This construction is said to eliminate all tendency to shimmy.

The rear wheels, which are "carrying" wheels only, since they are not used for driving, are also independently sprung and provided with compensators of a design similar to that used at the front. According to whether it is desired to make the chassis long or short, these compensators can be made to extend forward or backward from the axis of the rear wheels.

All four wheels of the car brought to this country are cast in Alpax, an aluminum alloy, and have steel brake drums set into them. It is claimed for these wheels that they are lighter than the best wire-spoked wheels. The brake drums are ventilated for efficient cooling, and their large diameter permits of mounting powerful brakes. By removing the wheels the entire brake mechanism is exposed for inspection.

The Bucciali uses a Mercedes Type SS six-cylinder engine with supercharger. In recent years the Bucciali Brothers have been developing a detachable motor fore-carriage, which permits of detaching the power unit

from the chassis and replacing it by another if desired. The method of connecting the fore-carriage to the chassis is illustrated by one of the photographs reproduced herewith.

Engineering Foundation Research

FROM the recently issued annual report of the Engineering Foundation for 1928, it is seen that the Foundation during the last year has contributed moneys toward the expense of a number of researches on subjects of interest to the automotive industry, and also has initiated on its own account certain work which should prove of benefit to that industry. The Engineering Foundation is a joint research organization of national engineering societies (civil, mining, mechanical and electrical), and was organized in 1914. It was endowed by Ambrose Swasey. It aids researches in various branches of engineering and the related sciences likely to yield results of broad usefulness, especially cooperative projects approved, undertaken or sponsored by one or more of the national engineering societies.

One line of research to which financial aid has been extended is that concerned with fatigue of metals. The committee of the National Research Council, which had general charge of this research, was disbanded last year. After reorganization of the committee and a revision of the program, the project has been continued under the auspices of the American Society for Testing Materials. Prof. H. F. Moore is conducting the work, as formerly, at the University of Illinois. Important activities are in progress also in other laboratories, notably at the U. S. Naval Engineering Experiment Station at Annapolis, Md., at the Bureau of Standards, and at the University of Wisconsin.

The Foundation contributed \$2,500 between 1924 and 1928 to the research work on the strength of gear teeth which has been conducted at the Massachusetts Institute of Technology. A little more than \$4,000 was contributed by the gear manufacturing and using industries, as well as material worth several thousand dollars.

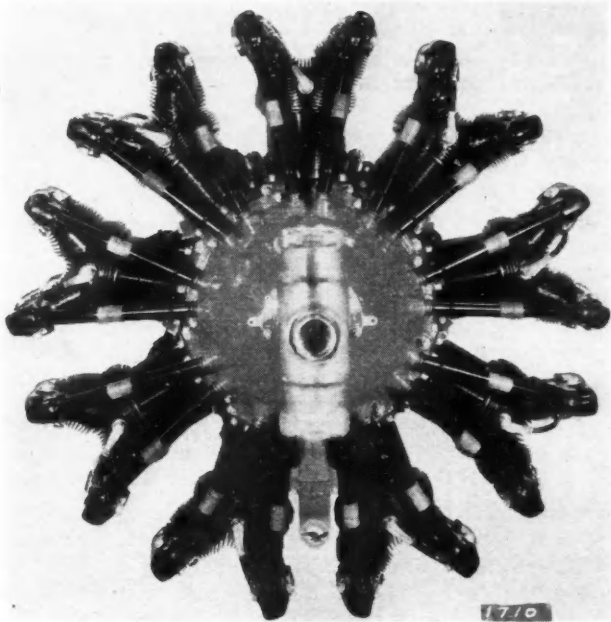
At the Bureau of Standards under the direction of Mayo D. Hersey, a committee during the past year conducted tests on friction of journal bearings as influenced by clearance and length. A special testing machine was designed and built for this purpose.

New Automotive Developments

Wasp 300-hp. Engine

A NEW 300-hp. nine-cyl., air-cooled, radial aircraft engine to be known as the Wasp Junior has been extensively tested and will be put on the market soon by the Pratt & Whitney Aircraft Co., Hartford, Conn. This is a smaller unit than any turned out by the company since its organization four years ago.

The new model, which is of 985 cu. in. displacement, weighs less than 550 lb. and is 45 $\frac{3}{4}$ in. in diameter overall. It is essentially the Wasp engine with smaller working parts, and is rated at 300 hp. at 2000 r.p.m.. It has bore and stroke of 5 3/16 in. each. The engine



Wasp Junior radial aircraft engine

incorporates all of the features of the Wasp and Hornet and the design is so standardized that 80 per cent of the parts are interchangeable. Even mounting dimensions are identical.

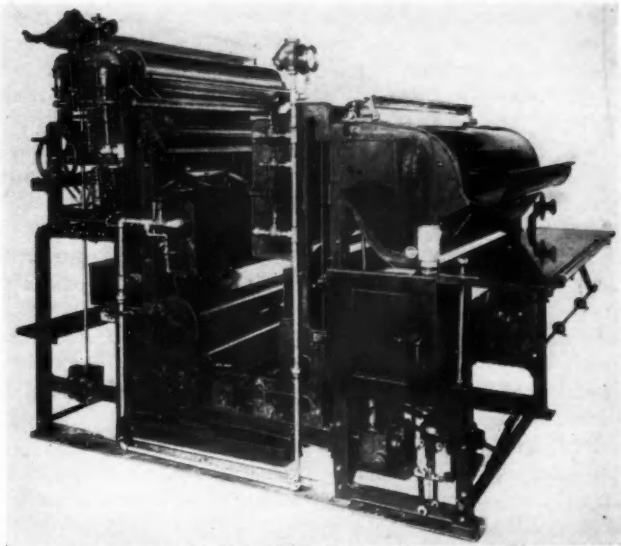
Owing to the use of the standard rear crankcase section, the engine has the same mounting circle as the Wasp. It is available with propeller reduction gears.

High Speed Blue Printing

HIGH-SPEED production, good prints and low operating cost are claimed by the manufacturer, the C. F. Pease Co., 813 North Franklin Street, Chicago, for the new Peerless Model 30 continuous blue-printing machine.

Following the usual practice, tracings are laid face up on a continuous roll of paper, feeding at the front of the machine, and are carried upward around a semi-circular, uniformly curved segment of French plate glass, past a bank of arc lamps. These lamps are individually mounted in horizontal alignment in front of the glass.

After the exposure has been made, tracings are automatically returned into the tray at the front of the



Peerless Model 30 blue-printing machine

machine near the operator's hands, while the prints on the continuous roll of paper are carried through the machine and the subsequent operations of washing, potashing and drying take place in succession. The paper is then automatically rolled up in loose cylinder form at the rear of the machine for cutting and trimming.

The new machine is direct-gear-driven throughout, has a speed range of from 4 in. to 12 ft. per minute and is powered with a variable speed $\frac{1}{4}$ hp. motor direct connected to a fully inclosed gear reduction unit running in oil. At the extreme left-hand side of the machine and mounted in the feed table is a special four-point auto-type gearshift providing for two forward speeds, high and low, also neutral and reverse. This reverse gear permits the operator to withdraw tracings or run back the leader roll. At the right of the machine there is an additional regulator in the form of hand-operated dial connected by sprocket chain to a rheostat located beneath the feeding table.

The new Model 30 is particularly adapted to long run, high-speed production, but individual prints can also be made on it. The machine is made in two widths, 42 and 54 in.

New Chromite Cement

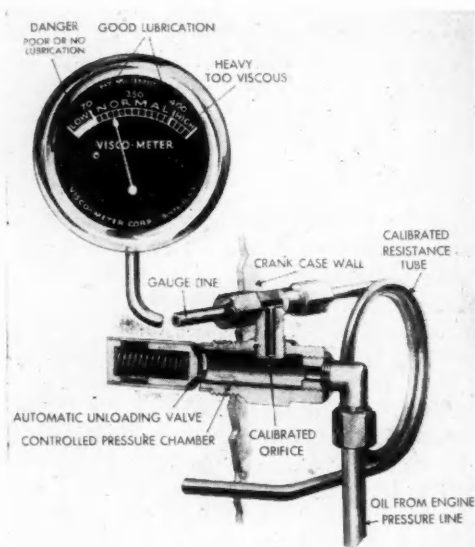
A DACHROME Plastic Super-Cement, a new high temperature cement, has been added to the line of the Botfield Refractories Co., Philadelphia, Pa. Because of its chromite base, this cement is chemically inert, and is also hard, dense and highly refractory. Furthermore, it employs a bonding agent which is said to be efficient at high temperatures. The material is suited for making either dipped or troweled joints. It is recommended by the manufacturers for laying up fire clay brick, silica brick, chrome brick, high alumina brick, and also for laying up magnesite brick under certain conditions. It is also adaptable for use as a surface coating material, and as a binder in the mixture of patching materials for repairing burned-out sections of refractory construction. This cement will be packed

in heavy gage metal drums of 250-lb. and 500-lb. capacity with full-size openings adding to convenience of use.

Visco-Meter Viscosity Gage

AN instrument for use on automobile engines which is designed to give a continuous visual indication of the viscosity of the crankcase oil has been placed on the market by the Visco-Meter Corp., Buffalo, N. Y. The illustrations shown herewith will serve to make the principle of the device clear. What is referred to as a controlled-pressure chamber is formed by a hollow plug which is screwed into the side wall of the crankcase. Oil from the engine pressure line enters this chamber through a tube and an L-fitting at its outer end. At the inner end of the chamber there is an automatic unloading valve, which is similar in principle to the pressure relief valve of the lubricating system. This control valve keeps the pressure within the chamber at 8 lb., provided the pressure in the lubricating system is higher than 8 lb. p. sq. in., and the instrument is intended for use only on engines in whose lubricating system the pressure is normally above this figure.

In the wall of the controlled-pressure chamber there is a calibrated orifice. Since the pressure on this orifice is of constant value, the rate of flow through it is independent of the pressure in the lubricating system.



Parts of Visco-Meter, shown sectioned to make clear its principle of operation

The orifice is located in the central arm of a T-fitting, the two other arms of which are connected, respectively, to a pressure gage on the dash and to the crankcase through a calibrated capillary resistance tube. Oil of low viscosity passes through the capillary tube with little resistance, hence the pressure built up in the tube is small and the gage registers low viscosity.

The Visco-Meter gage is calibrated in accordance with the standard Saybolt scale, its range being 30-600 seconds. Exhaustive tests are said to have shown it to be accurate within 5 per cent.

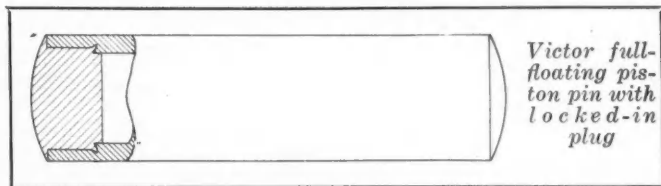
Auto Start Grinder

"AUTO START" grinders and buffers in a new 1930 series are announced by the U. S. Electrical Mfg. Co., Los Angeles, Cal. Among the improvements incorporated on these machines are the following: the new chip shield which is said to dispense with the need for goggles; a method of permitting proper guard clearance so that the tool holder can be maintained at a

uniform distance from the wheel as the wheel grinds down to a smaller diameter; and a new method of locking the tool rest. Auto Start grinders embody asbestos protected windings, anti-friction ball bearings and a cast aluminum rotor. The motor is a totally inclosed power unit and is manufactured in sizes from ½ to 5 hp., accommodating wheels from 8 x 1 to 18 x 3 in. Electrical specifications are 110 or 220-volt single phase; 220, 440 or 550-volt polyphase.

Piston-Pin with Non-Scoring Plugs

THE piston pin illustrated herewith is manufactured by the Victor Piston Pin Co. of Indianapolis, Ind. It is intended to be used as a full-floating pin, and it



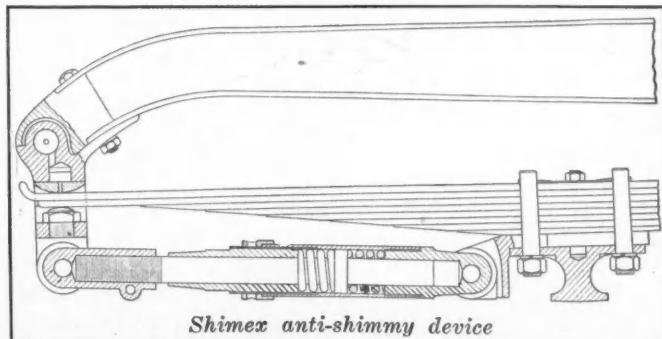
has plugs of a soft alloy fastened into the pin at both ends.

In the manufacture of this pin, the plug recess is made in one operation, its depth below the bore of the pin being only about half what is usually allowed with plugs that are made a press fit in a straight recess. The plug is then machined to reasonable accuracy, both plugs are inserted in the pin and light pressure applied, either by means of a hammer or a press, this pressure causing the plugs to expand into the groove. As compared with the ordinary pin with soft metal non-scoring plugs fitted in, this method of production is said to result in considerable economy.

Anti-Shimmy Apparatus

AN apparatus claimed to remedy all cases of shimmy has been placed on the European market under the title Shimex and will shortly be introduced to the United States by M. A. Mertens, the European distributor for Snubbers. The apparatus consists of an elastic strut between frame horn and spring seat, which assures the traction of the axle and takes up all brake reactions, thus leaving the springs free to fulfill suspension functions. As a consequence, the forward pivot is replaced by an attachment allowing the master leaf (and perhaps also the second) to slide, the rear shackle being retained, while the flexibility of the spring can be considerably increased without shimmy developing.

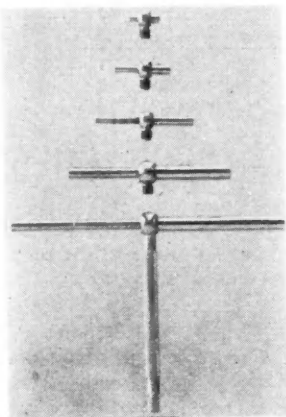
The apparatus, as shown in the accompanying drawing, consists of two-part struts which allow a slight longitudinal movement of the axle under road shocks transmitted to the wheel, these movements breaking the synchronism of the lateral oscillations of the chassis. The advantages claimed for Shimex are improved sus-



pension, for the springs have to fulfill one role only; the removal of all danger by reason of the breakage of a main leaf; easier steering with the elimination of "wheel fight" and elimination of the forces which set up shimmy.

No. 590 Telescoping Gages

A NEW tool for use with a micrometer to determine internal measurements has been announced by the



B. & S. telescoping gages

Brown & Sharpe Mfg. Co., Providence, R. I. No. 590 Telescoping Gages are comprised of five heads interchangeable on one handle. The telescoping head is inserted into the hole or slot to be measured, where it expands to the exact size of the hole. A turn of the knurled screw on the end of the handle locks the head and the gage is then removed and measured with a micrometer. The measuring surfaces of the heads are ground on a radius adapting the tool for measuring curved surfaces.

Tru-Stop Control

A TUBE-AND-CABLE mechanism, mainly for brake operation, has been developed by the American Cable Co., Bridgeport, Conn., and will be marketed by it as the Tru-Stop control. It already has been adopted for use on one of the large-production cars. Several manufacturers of motor trucks also have adopted it or are considering its adoption.

The inner member through which the motion is transmitted consists of a cable 3/16 in. in diameter and made up of 37 rust-proofed wires. The fittings at the ends of this cable are secured to it by the Tru-lock process, which consists in the flowing of the fitting metal, while cold, into the interstices between the wires of the cable. No solder is used, and since the cable and fitting are not heated, there is no impairment of the physical properties of their materials.

The tube is a conduit having on the inside a close-wound coil of spring wire, which gives a large bearing surface for supporting the cable. Over this inner close-wound coil there is a cable covering whose individual wires form helices of comparatively large pitch; and over this cable covering there is a wrapping of spring wire, which holds the wires of the cable covering together, prevents "bird-caging" and gives greater strength in compression.

Sikorsky Airplane Brake

THE Sikorsky Aviation Corp., Bridgeport, Conn., has developed a new multiple disk brake which is now in production and being fitted to all Sikorsky amphibians, enabling them to land in a space of 300 ft., we are informed.

There are three stationary plates in the new brake,

the two outside plates having lining applied to one side only, while the center plate is lined on both sides. The arms of the stationary plates support the brake lining and carry the braking torque inward toward the axle. These plates are only 0.062 in. thick, but they are said to be able to transmit safely more than 25,000 lb.-in. of braking torque, this being due to the fact that the stresses are entirely within the plane of the disks and none transverse thereto.

In the cockpit of the Sikorsky amphibian are two hydraulic cylinders operated by the brake pedals. These cylinders connect by flexible hose to brake cylinders on three sets of stationary arms, making three brake cylinders per wheel. All cylinders on one wheel are interconnected, and when pressure is applied to the pedal in the cockpit, the pistons in the brake cylinders are forced outward. Both the cylinders and the pistons are connected up through locking levers, and the outward forces exerted by them result in an inward pressure tending to clamp the three stationary arms and the two rotating rings together. Rotation of the wheels causes the rings to turn, and the rings,



Sikorsky multiple-disk aircraft brake

being clamped between the brake lining on the stationary members, set up a strong resistance to rotation of the wheels. Excessive braking effort would result in nosing the ship over, and this has been provided against by moving the wheels slightly forward, thus increasing the weight on the tail skid.

Terminal Material in Spark Plugs

(Continued from page 87)

- in low compression engines.
2. Electrode shapes least affected by corrosion. (No sharp edge or points at the gap.)
3. Good electrode wire.
4. Correct carburetion.
5. Proper spark plug position in combustion chamber.
6. Correct breaker point gaps.
7. Clean and square breaker points.
8. Correct spark plugs for the condition under which the engine is used.
9. Avoid metal shielding on secondary leads and reduce lead length to the minimum necessary.

Tru-Stop tube-and-cable control for brakes



News of the Industry

PAGE 100

VOLUME 62

Philadelphia, Saturday, January 18, 1930

NUMBER 3

Registrations Rise 7.6 Per Cent in '29

Passenger Car Increase Was
7.9 Per Cent for
Period

PHILADELPHIA, Jan. 16—Registration figures for the year 1929 received from state motor vehicle commissioners and other sources, and compiled by *Automotive Industries*, indicate an increase of 7.9 per cent in passenger cars registered, as compared with the year 1928. An analysis of the figures follow:

Final motor vehicle figures for 1929 have been received from most of the states and preliminary figures are in for the remaining states. The most accurate figures available today, show passenger cars 23,001,132, an increase of 7.9 per cent over 1928; trucks 3,237,675, an increase of 4.77, and buses where segregated (23 states) 127,881. Total motor vehicles 26,366,688, an increase of 7.6 per cent.

These figures can be compared with 1928 registration figures of passenger cars 21,316,657, trucks 3,092,059 and buses where segregated (24 states) 92,288. Total motor vehicle registration 24,501,004.

In the above figures, duplications caused by including transfers, replacement of tags, registration of the same vehicle in two or more states have been eliminated wherever possible. The totals, therefore, are very close to the actual number of motor vehicles registered in each state.

Italian Air Aid Increased

WASHINGTON, Jan. 15—Italian Government appropriations for civil aviation in 1929 amounted to 68,000,000 lire (approximately \$3,578,950), an increase of nearly 100 per cent over the sum of 35,000,000 lire (approximately \$1,842,100) spent in 1927, according to a report from Vice Consul Donald C. Wilcox, made public by the Department of Commerce.

AC Reports Orders Up

DETROIT, Jan. 14—Orders for January delivery are far ahead of orders received over any other January in the company's history, it has been reported by W. S. Isherwood, sales manager of the AC Spark Plug Co. of Flint, Mich.

Traffic Fatalities May Show Gain Over '28

NEW YORK, Jan. 13—Traffic fatality figures for 1929 when finally compiled will exceed 1928 both with respect to population and rate per vehicle, the Executive Committee of the National Conference on Street and Highway Safety predicts as the result of a meeting held here last Friday. The committee at this meeting endorsed a series of constructive studies and measures of relief for this situation.

Brazil Offers New Market

WASHINGTON, Jan. 17—American road-making equipment is generally preferred in Brazil, although some European equipment has been purchased, principally from Germany and England, according to a report received by the Department of Commerce from Howard H. Tewksbury, automotive trade commissioner to South America. The report declared that, barring serious economic or political disturbances, there is every reason to believe that during the next few years there will be a constantly increasing demand for all types of road-making machinery. The demand exists, it was pointed out, not only with the Federal government, but also with the more progressive state governments and with the larger contractors undertaking road and bridge construction. Planers, scrapers, graders and tractors are commonly used in most of the east coast states as far north as Pernambuco.

New Spark Plug Announced

GALION, OHIO, Jan. 15—A new line of spark plugs for all makes of engines, including Ford, has been announced by the All-American Products, Inc., of Galion. Porcelains for the new plugs will be made by the Frenchtown Porcelain Co., Trenton, N. J.

Thompson Adds Laboratory

CLEVELAND, Jan. 13—A dynamometer testing laboratory which will be one of the finest in the country is now being installed at the Cleveland plant of Thompson Products, Inc. Remodeling of a building to house the equipment has already been completed.

Reeves Sees Evil in French Tariff

Proposed Laws Would Remove
Necessary Competition, He Says

NEW YORK, Jan. 15—Export executives of American automobile manufacturers are discussing plans to forefend French adoption of legislation aimed to prevent importation of American automobiles, according to a statement issued this week by Alfred Reeves, general manager of the National Automobile Chamber of Commerce.

Mr. Reeves, in his statement, refuted the French argument of an unfavorable balance of trade by pointing out the large amounts spent by American tourists in France which would make the balance distinctly favorable to France.

"Passage of such legislation," said Mr. Reeves, "would remove a stimulating competitive agent for the French industry, which gives it a wholesome incentive to reduce costs and perfect its products, thus furnishing motor transport at lowest cost possible to the French public. It might, however, serve to offset France's present strenuous efforts to increase its most profitable business, that of goods and services sold to tourists from this side of the Atlantic."

Durant Prices Announced

DETROIT, Jan. 13—A. I. Philp, chairman of the board of Durant Motors, Inc., has announced prices of the new Durant models, displayed at the opening of the 1930 automobile show, as follows:

Model "6-14" Three-Speed

Business coupe	\$785
Standard coupe with rumble seat	815
Standard sedan	845
De luxe coupe	945
De luxe sedan	975
Sport roadster	935
Sport phaeton	960

Model "6-17" Four-Speed

Business coupe	\$995
Standard coupe with rumble seat	1,025
Standard sedan	1,065
De luxe coupe	1,155
De luxe sedan	1,195
Sport roadster	1,155
Sport phaeton	1,185

Olds Officials See Continued Progress

Gain of 28 Per Cent in 1929 Sales Over 1928 Reported

LANSING, MICH., Jan. 13—Closing the best year in its long history, Olds Motor Works is entering 1930 with increasing production schedules for both the Oldsmobile Six and Viking Eight. It is expected that the production during January will exceed that of the same month a year ago.

Factory officials report that 1929 has repeated the record of consistent sales gains which have been recorded for the past several years. The production and shipment of cars for domestic consumption, exclusive of exports, during 1929 registered 28 per cent greater than during 1928, which was the best previous year in the company's history. During the past two years the increased business has averaged 40 per cent.

During the past year five huge new buildings have been constructed, adding more than 500,000 sq. ft.—552,204 to be exact—to the floor area of the plant. These consist of a new sheet metal building with 121,444 sq. ft., an administration building containing 80,000 sq. ft., a parts service building of 168,160 sq. ft. floor area, and two buildings devoted to the construction of Fisher bodies which have a combined floor area of 191,600 sq. ft.

This large building expansion completed in 1929 is part of a continuous program which has been in progress since the summer of 1928. During that period there have been 12 new buildings constructed with a total floor area of 1,393,250 sq. ft., or more than half the total floor area of the plant, which contains 2,704,495 sq. ft.

Publishes Air Navigation Code

WASHINGTON, Jan. 17—Official requirements for displaying identification marks and for the marking of licensed and unlicensed are contained in Aeronautics bulletin No. 15, entitled "Air Traffic Rules," just made public by the Aeronautics Branch, Department of Commerce. The bulletin is profusely illustrated and is of especial value to pilots and student pilots. Copies may be had without charge upon application to the Aeronautics Branch, Department of Commerce.

Thompson Issue Approved

CLEVELAND, Jan. 13—Stockholders of Thompson Products, Inc., today ratified the proposal to merge the Class A and B shares into one issue of new no-par common stock with voting power. This means that 214,068 shares of Class A and 48,592 shares of Class B stock will be exchanged share for share into 262,660 shares of no-par stock. Heretofore, only the Class B stock had normal voting power.

Standards Society to Be Underwritten

NEW YORK, Jan. 13—American Standards Association has had its expenses underwritten at the rate of \$150,000 a year for a period of 3 years, according to announcement just made by William J. Serrill, president. The underwriting was done by a large group of industrial organizations through a committee consisting of James A. Farrell, president, United States Steel Corp.; Gerard Swope, president, General Electric Co.; George B. Cortelyou, president, Consolidated Gas Co. of New York; and F. A. Merrick, president, Westinghouse Electric and Mfg. Co.

Joint Meeting Planned

NEW YORK, Jan. 16—Numerous phases of motorboat engineering, construction and equipment are to be discussed at a motorboat meeting to be held by the Society of Automotive Engineers and the National Association of Engine and Boat Manufacturers on Jan. 22 and 23 in New York during the week of the National Motorboat Show.

There is to be a technical session on the afternoon of each day on the seventh floor of Grand Central Palace, in which the show will be in progress. The final event of the meeting will be a dinner for the engineers at the Hotel Roosevelt on the evening of Jan. 23, at which the Metropolitan Section of the Society is to be the host.

At the technical sessions addresses are to be given on Diesel engine developments, outboard engines, boat standardization, boat lighting and safety.

Hyatt Advances Porter

NEWARK, N. J., Jan. 16—H. J. Forsythe, president of the Hyatt Roller Bearing Co., Newark, N. J., has announced the appointment of H. K. Porter as general sales manager. Mr. Porter succeeds H. O. K. Meister, who was recently promoted to assistant general manager of the Hyatt company.

During the past 14 years, in which Mr. Porter was a member of the Hyatt organization, he held various positions on the sales staff and was assistant general sales manager prior to his new assignment.

G.M. Sales to Users Reported by Sloan

December, 1929, Gained Over December, 1928, but Was Below November

NEW YORK, Jan. 17—General Motors dealers sold to customers during December 48,253 cars, making a total for the year 1929 of 1,860,403, according to an announcement made by Alfred P. Sloan, Jr., president. The December figure compares with 33,441 for December a year ago, and with 90,871 in November of 1929. The total sales of 1,860,403 in 1929 compare with 1,842,443 for the entire year 1928.

Sales by General Motors Divisions to dealers during December, 1929, were 40,222, making the year's sales 1,899,276, and compare with 35,441 for December, 1928. During that year a total of 1,810,806 units were sold.

Comparative figures follow:

DEALERS SALES TO USERS		
	1929	1928
January	104,488	107,278
February	138,570	132,029
March	205,118	183,706
April	223,303	209,367
May	214,870	224,094
June	194,705	206,259
July	181,851	177,728
August	173,884	187,463
September	145,171	148,784
October	139,319	140,883
November	90,871	91,410
December	48,253	33,442
Total	1,860,403	1,842,443

DIVISION SALES TO DEALERS		
	1929	1928
January	127,580	125,181
February	175,148	169,232
March	220,391	197,821
April	227,718	197,597
May	220,277	207,325
June	200,754	186,160
July	189,428	169,473
August	168,185	186,653
September	146,483	167,460
October	122,104	120,876
November	60,977	47,587
December	40,222	35,441
Total	1,899,276	1,810,806

Gets Special Body Contract

TOLEDO, Jan. 14—Contract for 300 special bodies for trucks has been awarded to the Bryan Specialty Co., Bryan, Ohio, by the Willys-Overland Co., Toledo.

Financial Notes

Company	Remarks
American Chain	reg. quar. div. \$1.50 Jan. 20 rec. Jan. 13
American Machine & Fdry.	increased com. div. to \$1.75/sh., now \$7 annual basis, reg. div. \$1.75 on pref., both Feb. 1 rec. Jan. 17
Fairey Aviation Co., Ltd.	div. 12 cts. Amer. sh., Jan. 15, rec. Jan. 13
General Tire and Rubber	reg. quar. div. \$1, Feb. 1 rec. Jan. 20
Goodyear Tire & Rubber Co.	reg. quar. div. \$1.25, Feb. 1 rec. Dec. 31
H. H. Franklin Mfg. Co.	reg. quar. div. \$1.75 pref. Feb. 1 rec. Jan. 20
Johnson Motor	authorized 19,710 added shares, holders Jan. 14 allowed 1 add. sh. for 5 held, rts. end. Jan. 27
Lee Rubber & Tire Corp.	net prof. yr. to Oct. 30, '29, \$485,930 net, \$1.61/sh.
McCord Radiator and Mfg.	reg. div. Class B, 50 cts., Feb. 1 rec. Jan. 28
Motor Products	com. div. 50 cts., April 1, rec. March 20
Nash Motors	reg. quar. div. \$1.50 Feb. 1 rec. Jan. 16
Sundstrand Mach. Tool	reg. quar. div. 50 cts. Jan. 15 rec. Dec. 31

Men of the Industry and What They Are Doing

Peterson Joins Ford

C. Gilbert Peterson, who for a number of years has been identified with both the engineering and sales phases of the airplane industry in the United States, has joined the sales organization of the Airplane Division of the Ford Motor Company, in the capacity of sales engineer. Mr. Peterson was associated with the Wright Aeronautical Corporation for seven years in various executive and engineering capacities. He conducted an investigation of multi-engined metal planes in Europe for the Wright Company, and at the time of his resignation was president of the Wright Flying Company and general sales manager of the Wright Aeronautical Corporation.

Mathews Goes to Porto Rico

In the interest of the manufacturers whose export business is handled by the H. M. Robins Co., export factors, Detroit, J. C. Mathews, general manager of the company, sailed from New York on Jan. 9 for San Juan on the S. S. San Lorenzo. The H. M. Robins Co. operates the Export Department of the newly organized Robert Gottfredson Truck Co., for which Mr. Mathews will establish representation in Porto Rico and Cuba while in those countries.

Stewart is Promoted

The appointment of L. A. Stewart as production manager of the Oldsmobile-Viking factories has been announced by D. S. Eddins, vice-president and general manager of Olds Motor Works. Mr. Stewart is a veteran in the automotive industry and for the past seven years has been material supervisor at the Oldsmobile-Viking plant.

Wilson is Transferred

J. M. Wilson, for the past two and one-half years manager of the Atlanta zone, has been appointed manager of the Southeast Region of the Oldsmobile-Viking sales organization, according to an announcement just made by J. T. Collins, general sales manager, Olds Motor Works.

Hergenroether Becomes Realtor

George W. Hergenroether has become associated with Houseman-Spitzley Corp., real estate brokers. Mr. Hergenroether was formerly with Dodge Brothers and the Chrysler Corp., holding the position of assistant treasurer with the former company.

Eaton Made Director

J. O. Eaton, chairman of the board of the Eaton Axle & Spring Co., has been elected to the board of directors of the Cleveland Tractor Co., Cleveland, Ohio.

Lannon is Advanced

President Martin A. O'Mara of the Brockway-Indiana Motor Truck Corporation has announced the election of John D. Lannon as vice-president and general manager, a director and member of the executive committee. The election of Mr. Lannon, with that of C. M. Finney as the new treasurer of



John D. Lannon

the corporation, will complete the organization of Brockway as originally planned when that company merged with the Indiana Truck Corporation.

Mr. Lannon will bring to the Brockway-Indiana organization an automotive experience so exceptional that it actually antedates the birth of the gasoline-driven motor vehicle. He was with the Locomobile company when that organization launched the first steamer. Since those early days of the industry Mr. Lannon has either directly or indirectly designed and built every component part that goes into a motor truck, and has held practically every position in the industry from foreman to general manager.

Franklin Elects Dougherty

J. Jay Dougherty has been elected assistant secretary and treasurer of the H. H. Franklin Mfg. Co. and the Franklin Automobile Co. He takes the place of Claude E. Hull, whose ill health followed a serious sickness last year, compelled him to resign. Mr. Dougherty comes to the Franklin organization from Haskins & Sells, auditors and accountants.

John Pawlowski Is Injured

John Pawlowski, production manager of General Motors Polse, was rather severely hurt last week when his private airplane in which he was making a trip crashed in a forced landing. His pilot was killed outright and he himself suffered a broken hip and several cuts and bruises.

Reed Joins Detroit Forging

The Detroit Forging Co. has added to its sales engineering department in Detroit George B. Reed, formerly associated with the Endicott Forging and Manufacturing Co. Mr. Reed has spent some twenty years in the forging industry.

Kahn to Aid Soviet

DETROIT, Jan. 13—Albert Kahn, Inc., Detroit architects and engineers, well-known in automotive circles, have become consulting architects to the Union of Soviet Socialist Republics through an agreement with Saul G. Bron, New York representative of the Supreme Economic Council of Soviet Russia. The appointment is in connection with the five-year plan for the industrialization of the Soviet Union, which includes the proposal to build four automobile, truck and motorcycle plants and nine plants for tractors and farm implements.

Brown Denies Rumor

COLUMBUS, Jan. 15—Complete denial of the report that the Brown Manufacturing Co., makers of auto lamps, which company was recently acquired by the Auto-Lite Co. of Toledo, would be moved from Columbus and combined with the Toledo plant, have been made by John W. Brown, president of the organization and by executives of the Auto-Lite Co. It has been stated that there may be some curtailment in operations in the plant which normally employs about 800 workers. The plant is now on full time production.

Aument is Promoted

Carroll M. Aument has been promoted from production manager to factory manager of both the Teterboro and Passaic plants of the Fokker Aircraft Corp.

Mr. Aument joined the Fokker organization in October, 1928, as production manager, having previously been associated with a number of automobile, truck and bus manufacturing concerns, as well as with the Wright Aeronautical Corporation.

Palm Joins Young Radiator

George H. Palm, for the past six years engineer with the new development division of the Yellow Coach & Mfg. Co., Pontiac, Mich., a division of General Motors, has become connected as engineer in charge of radiator construction and equipment, with the Young Radiator Co., Racine, Wis.

Perrot Coming to U. S.

Henri Perrot, brake expert, will sail for the United States, on the *Ile de France*, Jan. 29. Mr. Perrot will remain in America one month in connection with his brake and other automotive interests.

Kublin Joins Auburn

George H. Kublin has joined the engineering force of the Auburn Automobile Co., according to an announcement by the company.

Steel Mill Orders Show Activity of Car Plants

NEW YORK, Jan. 16—Automotive consumers continue to place orders for their nearby steel requirements, enabling rolling and finishing mills to maintain an operating rate of approximately two-thirds of their capacity. Some of the business placed in the last few days calls for immediate shipment, indicating that quite a few consuming plants permitted their steel stocks to dwindle to zero on the eve of inventory-taking, and that the need of providing for broader production schedules came somewhat earlier than they had anticipated.

While nearly all the business emanating from motor car and parts manufacturers reflects hand-to-mouth buying and only a very few of these are giving any thought to their needs a month or two hence, steel producers find comfort in the thought that the momentum of automotive demand, slow as it seems by comparison with some of the post-show periods of former years, has at last gotten under way. The increase of 291,848 tons in the leading interest's unfilled tonnage, as revealed by the statement for the closing month of 1929, failed to make very much of an impression, the apparent improvement being ascribed solely to contracts for rails and tin plate. In fact, there was some disappointment at the paucity of contracting for first quarter from the general run of consumers.

Prices for semi-finished steel are under considerable pressure, non-integrated rollers of sheets and strip-steel pleading the lower prices for their finished products by way of seeking concessions. A report current in the New York market that the leading wire products interest had lowered prices 10 points was followed on the heels by a denial from the Chicago headquarters of the company. Automotive alloy steels and cold-finished steel bars are steady amid fair demand.

Pig Iron—While sales of foundry and malleable irons in the Middle West reflect heavier melts by automotive foundries, many of the latter are still drawing on their fourth-quarter 1929 commitments. Most of the current buying is in small lots for immediate shipment, and to some extent buyers' hesitancy in taking hold is ascribed to their belief that, so far as prices are concerned, they have nothing to lose by a waiting attitude.

Aluminum—The aluminum industry is benefited by the better operating rate of automotive plants to about the same extent as are steel producers. Secondary aluminum manufacturers say they are doing about two-thirds the business which they did last January. They are paying considerably less for clippings and scrap than they did a year ago, the reduced demand for their product having resulted in a decline of approximately 2c per pound in scrap values, as compared with a year ago. Virgin aluminum prices have undergone no change in that time.

Copper—Domestic consuming demand is still light. The formal opening of the new refinery of the Nichols Copper Co. at El Paso, Tex., on Jan. 28, will add 100,000 tons to the country's annual refinery output.

Newark Show Has Historical Exhibit

NEWARK, N. J., Jan. 13—"From Shanks' Mare to Sixteen Cylinders" is the title of the Newark Museum and Public Library's joint exhibition at the Newark Automobile Show of historic models, prints, posters and pictures, tracing the development of the motor vehicle from Cugnot's kettle on wheels to Model 1930. This historical review of horseless vehicles from 1770 to date is said to be the first instance of cooperation of this kind between a public library, a city museum and a large automobile show.

Curtiss Moves Moth Plant

ST. LOUIS, Jan. 15—The Gipsy Moth, two-place training and sport plane, will be manufactured at the Curtiss-Robertson Airplane Mfg. Co., at Lambert-St. Louis Field, it was announced today. Transfer of the Moth factory from Lowell, Mass., to St. Louis is to eliminate duplication of manufacturing in the Curtiss-Wright organization. Machinery and tools will be reinstalled here and production will be in charge of Minton N. Warren, former president of the Moth Co. Warren will also have charge of production of Robin and Thrush planes. It will not be necessary to increase the capacity of the local plant.

Borg & Beck Orders Up

CHICAGO, Jan. 15—Increase of 120 per cent in clutch orders has been shown in the last 30 days by the Borg & Beck Co., a subsidiary of the Borg-Warner Corp. Present unfilled orders indicate that production will be stepped up within a few days. This was announced today by C. S. Davis, president of the parent company.

Detroit Plant Operating

DETROIT, Jan. 13—The Detroit Steel Products Co. has put in operation its new spring plant, devoted to the manufacture of automobile chassis springs. The plant, which provides 125,000 sq. ft. of floor space and storage room for 10,000 tons of raw steel, was completed Dec. 17.

Begins Glider Construction

DETROIT, Jan. 13—Construction of 100 gliders has been started at the Campau Street plant of the Detroit Aircraft Corp., and plans made for another 100 to be turned out in 30 days after the first contingent.

Adopts New Calendar

DETROIT, Jan. 13—The Square D Co. of Detroit has announced that effective as of Jan. 1, 1930, all accounts, salaries and internal records of the company will be handled on the basis of the new 13-period year.

Chance Vought is Moving Operations to Hartford

NEW YORK, Jan. 15—The Chance Vought Corp. is moving its operations to Hartford, Conn., where it will occupy a new plant which has been under construction for several months. The new plant was designed by Albert Kahn, Inc., of Detroit. The progressive assembly line method of manufacture will be used in this plant, similar to that used for many years by the Vought company in its Long Island City plant.

The new Hartford plant consists of a single story factory building 320 ft. long by 620 ft. overall, and an administration building 51 ft. by 180 ft., providing about 175,000 sq. ft. of floor space. The factory building exterior is of cream brick and cast stone, and the interior has 80 ft. clear spans, with 24 ft. ceiling in the final assembly section, and 18 ft. in the remainder of the plant. The roof truss and window arrangement is novel, providing practically even natural lighting throughout the plant.

The new Vought plant is located adjacent to the new plant of Pratt and Whitney Aircraft Co. which is already in operation. Both plants adjoin the United Airport, which is to be constructed and which will provide the eastern center of activities for all United Aircraft and Transport Corp. units. The total land occupied by these projects is over 600 acres.

Henry Sturme

LONDON, Jan. 13—Henry Sturme, one of the pioneers of the British automobile industry, died at Coventry on Jan. 9, aged 72 years. He was prominent as writer and editor as well as inventor and promoter, and for a long time he had close connections with the American automobile industry by importing American cars and parts into England and manufacturing such products there under license.

At the beginning of the bicycle era Sturme associated himself with W. I. Illiffe to establish a cycling paper known as *The Cyclist*, of which he became the editor and which was conducted successfully by the partnership for twenty-five years. *The Autocar*, the first weekly in the world devoted to motoring, was founded by Illiffe and Sturme in 1895, before motoring was legally possible in England, and Sturme assumed the editorship of this publication as well.

During a trip to the United States some years later he became interested in the vehicles of the Duryea Motor Vehicle Company, and in 1901, after having been involved in an accident during a trial of an experimental car in England, which laid him up for six months, and after having resigned from *The Autocar* as the result of a dispute with his partner, Sturme organized a company to manufacture Duryea cars in England. Some years later he took up journalistic work again.

N.A.C.C. Files Support of Couzens Bus Bill

WASHINGTON, Jan. 17—Support of the principle of regulation of motor bus transportation in interstate commerce was reiterated by the National Automobile Chamber of Commerce through a special committee in a statement submitted last week to the House Committee on Interstate and Foreign Commerce, by Pyke Johnson, Washington representative of the chamber. The statement explained that the chamber, with railroad and public utility commissions, steam and electric railroads, and motor bus operators, has now agreed upon proposals carried in the bill introduced by Senator Couzens of Michigan. This measure is largely similar to the Parker bill which was again the subject of hearing last week before the House committee.

Because it is felt that highway transportation should stand or fall solely on its merits and the desire of the public for this form of communication, the chamber restated its opposition to the section of the Couzens bill requiring the Interstate Commerce Commission to take into account "existing available transportation services" in connection with authority to issue certificates of public convenience and necessity. This proposal was declared to be unnecessary, yet the chamber announced it is ready to accept the judgment of those who propose it "at least until it shall have been given a fair trial."

Graham Distributors Meet

TOLEDO, Jan. 14—Nearly 300 distributors and field men of the Graham-Paige Motor Car Co. visited the plant of the Libbey-Owens Glass Co., here to see the process of making laminated glass, now used on all windows of the Graham cars. Ray Graham, secretary and treasurer of the Graham-Paige company, presided at a dinner at the Toledo Club at which J. C. Blair, president of the Libbey-Owens company, and C. O. Miniger, president of the Electric Auto-Lite Co., were speakers. The Graham party came to Toledo by bus as part of a dealer convention program.

American Units in Contest

PARIS, Jan. 7—Of the 10 machines entered in the snow plough competition to be organized in the Alps next month, by the Touring Club of France, five are of American construction, two are Norwegian, and three are French. The American machines include a Ford with a Sargent plough, a Fordson tractor adapted for snow-fighting by M. Alouis of Paris; a Wilford mechanical shovel, and an entry by the Allied Machinery Company.

Stout Moves Offices

DETROIT, Jan. 13—Offices of the Stout Metal Airplane Co. have been moved into the new \$475,000 addition to the factory at Dearborn, Mich. The addition to the plant, which doubles the floor space of the factory, will soon be ready for airplane building operations.

G.M. Export Men Now in Transit

NEW YORK, Jan. 17—L. M. Rumely, general manager of General Motors Export Co., sailed today on the S.S. *Ile de France* for a two months' visit to the European assembly plants of his company at Paris, Stockholm, Copenhagen, Berlin, London, Antwerp, Madrid, Alexandria and Warsaw.

Among other recent movements of General Motors Export Co.'s executives was the arrival on Jan. 8 of W. B. Wachtler, formerly assistant managing director of General Motors G.m.b.H., Berlin. Mr. Wachtler, who arrived on the *Bremen*, has returned to the home office for a new assignment.

A. B. Paddock, assistant to the managing director of General Motors Nordiska, Stockholm, returned to New York on Jan. 15 on the S.S. *Aquitania*.

F. D. Peabody, recently appointed manager of zones for General Motors do Brasil, and C. W. Borders, formerly assistant sales manager of General Motors Peninsular, recently appointed sales development manager of General Motors do Brasil, sailed Jan. 11 on the S.S. *Western World* for Sao Paulo.

R. J. Arnold, formerly manager of the financial control division of General Motors Export Co., also sailed on the *Western World* for Buenos Aires where he will take over new duties as treasurer of General Motors Argentina.

H. L. Howell also sailed on the *Western World* to assume his new duties as transportation engineer of General Motors do Brasil.

Rubber Output Restricted

NEW YORK, Jan. 15—Producers of crude rubber in the Dutch East Indies have formulated a new restriction plan calling for a reduction of from 10 to 20 per cent in the outputs of both native and European producers, according to a cablegram received this week from Amsterdam by the Rubber Exchange of New York, Inc. Under the plan, European producers will deposit 20 florins per ton and the native, or uncontrolled producers, two cents per kilogram, which will be forfeited in the event of non-fulfillment of obligations.

Rubber Imports Rise

NEW YORK, Jan. 15—Imports of crude rubber to the United States during the month of December totaled 43,542 long tons, according to estimates prepared by the Rubber Manufacturers Association. This compares with 40,621 tons in November, 1929. Imports for the year 1929 are estimated at 561,454 tons as against 446,421 tons for the previous year.

Hupp Reports 1929 Shipments

DETROIT, Jan. 13—Hupp Motor Car Corp. has reported that they have closed 1929 with total shipments of 50,578 cars, making the past year second only to record shipments of 65,881 cars in 1928.

Willys Directors Declare Regular Cash Dividends

TOLEDO, Jan. 14—Directors of the Willys-Overland Co. meeting here today declared the regular 30 cents dividend on common shares, payable Feb. 1 to stockholders of record Jan. 24, and the regular quarterly dividend of \$1.75 on the preferred stock, payable April 1 to holders of record March 18. This will mean distribution of dividend checks totaling \$1,162,500 on 800,000 shares of common stock and 150,000 shares of preferred stock.

The action of the directors is taken here to mean that the Willys-Overland Co. had a fairly good last quarter. Officials of the company see a good outlook for gradually increasing sales and production. There are now more than 7500 workers in the plant here and production is growing.

Central Alloy Active

CANTON, Jan. 13—The Central Alloy Steel Corp. has increased operations of its productive facilities to about 70 per cent of capacity, compared with the low point of around 40 per cent in December, it has been announced by F. J. Griffiths, chairman of the board of directors. Releases and new orders for sheets and other material from the automobile industry have expanded substantially since the first of the year.

Timken Operations Up

CANTON, Jan. 13—Improved operations at the plants of the Timken Roller Bearing Co. are reported with resumption of several departments last week. Approximately 4000 workers have returned to work following a two weeks' vacation. Officials said that orders are coming in satisfactorily and expectations were production might reach 75 per cent before the end of this week.

Show Attendance Gains

NEW YORK, Jan. 14—Paid attendance at the annual automobile show which closed here last Saturday was away in excess of that for 1929, according to reports emanating from the show management. Approximately 3000 dealers were in attendance at the show and business transacted is reported as very satisfactory.

Iowa Carrier Tax Upheld

WASHINGTON, Jan. 17—The United States Supreme Court has upheld the Iowa law of 1927 which imposes a "ton-mile" tax on public motor carriers operating over regular routes or between fixed termini, the funds to be used for maintenance and repair of the highways.

United Adds Trico Line

DETROIT, Jan. 13—F. A. Oberheu, vice-president and director of sales of United Motors Service announces the addition of Trico windshield wipers and sleet wands as one more of the specialized automotive lines distributed nationally through United Motors Service.

Automotive Construction is Feature of Building

PHILADELPHIA, Jan. 16—The seasonal low ebb of construction reports finds automotive programs continuing to be one of the features in announced building activities. Reports from machine tool manufacturers, however, show the effects of the usual low level of orders for this time of the year. Among the reports received this week were:

Consolidated Aircraft Corp., Buffalo, has established branch assembly plant at Langley Field, Va., where installation of equipment will be started soon.

Ford Motor Co., Detroit, has plans for \$750,000 assembly plant at Richmond, Cal. A 60-acre tract has been acquired on San Francisco Bay. Work to begin early in spring.

Mengel Co., Louisville, has awarded general contract to Platoff & Bush for \$75,000 addition to automobile body plant.

Mechanical Universal Joint Co., Rockford, Ill., to soon award contract for \$100,000 addition to plant.

Northwest Airways, Inc., St. Paul, is planning \$100,000 machine shop and assembly plant at St. Paul airport.

Birmingham, Ala., City Council arranging special election to vote bonds for \$1,000,000 for hangars and shops for municipal airport. Election will probably be in February.

Mexico City Ministry of Communications planning expenditure of \$3,500,000 for seaports on various coastal sites, machine and assembly shops, reconditioning shops, etc.

Norton Co., Worcester, Mass., planning expenditure of \$200,000 for additional building and abrasive products manufacturing machinery.

Jacksonville, Fla., City Commission has authorized immediate expenditure of \$25,000 for reconditioning shops at municipal airport.

Yellowstone Trail Garage, Wallace, Idaho, will erect early in spring a two-story and basement ramp garage, 100 x 100 ft., to cost \$60,000.

Jacob Ernst, Spokane, Wash., is completing erection of \$45,000 building to be leased to the White Co. for factory service branch.

Show Includes Boats

PHILADELPHIA, Jan. 13—Exhibits of motorcycles, motorboats and commercial chassis manufactured by makers of passenger cars feature the twenty-ninth annual Automobile Show being held here this week, under the auspices of the Philadelphia Automobile Trades Association. Many accessories were exhibited on the mezzanine floor of the Commercial Museum Building, scene of the show.

Packard Prices Announced

DETROIT, Jan. 13—Price increases of \$110 on three body models, effective Jan. 12, have been announced by the Packard Motor Car Co. They are, in detail:

Model	Type	New List Price
726	Sedan	\$2,845
733	Sedan	2,785
733	Sedan-limousine	2,885

League Submits Tax Measure

GENEVA, Jan. 10—With the object of promoting international motor touring, the Committee on Taxation appointed by the League of Nations has completed a draft of an international triptyque agreement which would make it possible for a motorist to take his car into any country and use it there for a period up to 90 days without the payment of dues and taxes of any kind.

Blue and Brown Off, Color Index Shows

NEW YORK, Jan. 15—A strong upward trend in black lacquer for automobile bodies, continuing of the decline in blue, and a further recession of brown, are noted in the December issue of the Automobile Color Index, published by E. I. du Pont de Nemours & Co. A comparison of the relative standing of the color families according to the indices for December, 1929, and December 1928, follows:

Blue, 172-174; brown, 113-85; black, 112-45; green, 106-101; grey, 48-156; maroon, 43-18.

Large cars for formal occasions will continue to be soberly finished in closely related, subdued colors, according to the index. More cars will be finished entirely in color without any recourse to black, and there will be an increasing tendency for wire wheels to be finished in the same color as the body striping.

Chevrolet Joins Martin

INDIANAPOLIS, Jan. 13—Louis Chevrolet, president of the Chevrolet Aircraft Corp., announced today that the organization would be moved to Baltimore on Jan. 15, where a factory will be established.

The Chevrolet Aircraft Corp. will there become affiliated with the Glenn L. Martin Aircraft Corp., which manufactures the Martin bomber, training planes and flying boats. The motor designed by Chevrolet is a 4-cyl. inverted motor capable of developing between 90 and 100 hp. at 1900 to 2000 r.p.m.

Form New Corporation

CADILLAC, MICH., Jan. 13—A new corporation is to be formed, it has been announced here, by a group of former directors of the Acme Motor Truck Co., who were also creditors. The company's assets were sold to the group at a receiver's sale Jan. 6, for approximately \$658,000. Obligations exceeding that amount to approximately \$200,000 have been assumed by the purchasers.

Reo Adopts Radio

LANSING, Jan. 13—Reo cars are now available with radio equipment, according to an announcement made by C. E. Eldridge, sales manager of the Reo Motor Car Co. Mr. Eldridge states that arrangements have been completed with the American Bosch Magneto Corp. to equip all Reo models with the new Bosch motor car radio at a slight increase over the regular list price of the car.

Changes Corporate Name

NEW YORK, Jan. 13—The Curtiss Aeroplane Export Corp. has changed its corporate name to Curtiss-Wright Export Corp.

Business in Brief

Written by the Guaranty Trust
Co., New York, exclusively for
AUTOMOTIVE INDUSTRIES.

NEW YORK, Jan. 15—Th unseasonable weather last week interfered with business, and retail trade in winter goods was particularly hindered. However, retail stocks were materially reduced by the post-holiday sales. Collections continue to be slow.

DEPARTMENT STORE SALES

Department store sales during December, according to an advance report of the Federal Reserve Board, were 2 per cent below those in the corresponding month in 1928. Decreased sales were reported by 365 stores, while 113 stores reported increases.

CHAIN STORE SALES

Sales of 20 store chains during December amounted to \$182,751,986, which marks an increase of 11.2 per cent above those in the corresponding month in 1928. Sales of these same store chains during 1929 were 18.28 per cent above those in 1928.

CONSTRUCTION CONTRACTS

Construction contracts awarded during December, according to the F. W. Dodge Corp., amounted to \$316,368,100, which marks a decrease of 19 per cent below those during the preceding month and a decrease of 37 per cent below those during the corresponding month in 1928.

BROKERS' LOANS

Brokers' loans in New York City during the week ended Jan. 8 declined \$72,000,000, reducing the total to \$3,352,000,000, as against \$3,424,000,000 a year ago.

FREIGHT CAR LOADINGS

Railway freight loadings for the week ended Dec. 28 totaled 638,445 cars, which marks a decrease of 29,529 cars below those a year earlier and a decrease of 42,109 cars below those two years earlier.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices for the week ended Jan. 11 stood at 93.1, as against 93.0 the week before and 93.1 two weeks before.

FEDERAL RESERVE STATEMENT

The consolidated statement of the Federal Reserve banks for the week ended Jan. 8 showed a further contraction in Federal Reserve credit. There were decreases of \$64,800,000 in holdings of discounted bills, of \$73,000,000 in holdings of bills bought in the open market, and of \$25,700,000 in holdings of Government securities. Member bank reserve deposits increased \$12,000,000. The reserve ratio on Jan. 8 was 72.9 per cent., as against 69.6 per cent a week earlier and 67.6 per cent two weeks earlier.

Ford Dealers Booked \$58,000,000 to Jan. 4

DETROIT, Jan. 13—Edsel B. Ford, president of the Ford Motor Company, has announced that more than \$58,000,000 worth of orders were booked by Ford dealers throughout the United States by Jan. 4, following the introduction of new Ford body types on Dec. 31.

"An interesting feature of this unusual volume of business," said Mr. Ford, "is the fact that it was evenly distributed over the country, indicating a generally healthy business condition."

"Production schedules at Detroit, and in every branch plant in this country are being immediately increased to keep pace with this nationwide demand."

A total of 9,732,889 persons saw the new body types during the first five days of the showing, according to reports from Ford branches and dealers in every section of the United States.

When the plants were being reorganized last November for production of the new body types, Mr. Ford said, temporary closing of the main plant at Detroit had been considered. Desire of the Ford Co. not to upset employment conditions unduly, resulted in a decision to continue operation of the plants with only slightly curtailed payrolls. While the production of completely assembled cars was discontinued in the latter part of November and early December, the River Rouge plant was devoted to the building of motors, chassis and other parts. As a result of this accumulation of materials, it is now possible quickly to increase production of complete cars at a rate that would not have been possible had the Detroit plant been shut down completely and 75,000 men laid off for several weeks.

Because branch plants, with one or two exceptions, are engaged only in the assembly of complete cars, these branches throughout the country were closed for two weeks in November for reorganization and to await materials for the new body types.

Abolishes French Gas Tax

PARIS, Jan. 2—Beginning Jan. 1, the Paris Municipal Council wiped out the local gasoline tax known as the octroi. The only practical result of this will be to relieve traffic obstruction at the gates, for it no longer is necessary for automobiles to stop to claim and give up pass-out vouchers on the amount of gasoline in their tanks. For several years there has been practically no revenue from this tax, for it was recognized that its strict application would have rendered traffic impossible.

Iowa Gas Tax Receipts Increase

DES MOINES, Jan. 13—Gasoline tax collection in Iowa for 1929 totaled \$9,987,186.06, according to the report of R. E. Johnson, state treasurer, the November tax, collected last month, being \$825,951.61. In 1928 a total of \$9,138,707.68 was collected, the current figure being an increase of \$748,487.38.

Exports Gain During First Eleven Months

WASHINGTON, Jan. 13—Shipments of all automotive products for the January-November period of 1929 were valued at \$537,153,119 and exceeded the 1928 total by \$15,055,145, the Department of Commerce announced today.

November exports were at a new low point for the year, amounting to \$27,129,963, as compared with \$34,660,887 in October and \$45,880,862 in November, 1928. The drop from the November figure of last year is largely accounted for by the decline in shipments of passenger cars.

Exports of passenger cars, numbering 29,684 with a valuation of \$21,733,510 during November, 1928, dropped to 13,929 units valued at \$10,394,995 for the corresponding months of last year, with all price classes being affected.

The average export valuation for the first eleven months of 1929 was \$48,832,101, as compared with \$44,178,024 and \$34,314,410 for the like periods of 1928 and 1927 respectively.

Moto Meter Adds Products

NEW YORK, Jan. 14—A smaller edition of the Moto Vox warning signal, known as the standard model, has been developed by the Moto Meter Gauge & Equipment Corp. and will be placed on the market within a short time to supplement sales of the larger size which has been in use for approximately one year.

A new recording thermometer, capable of charting temperatures from minus 40 to plus 750 deg. Fahr. has also been developed by the corporation. The new instrument is known as the Model 1000 Motoco Recording Thermometer.

Franklin County Sales Gain

COLUMBUS, OHIO, Jan. 13—According to the report of the county clerk, a total of 1036 passenger cars were sold in Franklin County during December. This is an increase from the number sold in November and is slightly less than the number sold in December, 1928. Ford led the list with 392; Chevrolet was second with 137; Essex was third with 113; De Soto was fourth with 46; Oldsmobile was fifth with 44 and Buick was sixth with 42.

Renault to Enter Canada

MONTREAL, Jan. 13—Renault, the French automobile manufacturer, has decided to enter the Canadian market and establish an agency in this city, according to information received from a reliable source. Details of the project, however, are not available at present.

Reports Increased Orders

HARTFORD, CONN., Jan. 15—The Jacobs Mfg. Co. announced shipments of more chucks on Jan. 2 than were ordered during December.

Prices Announced on Windsor White Prince

ST. LOUIS, Jan. 13—According to an announcement of the Moon Motor Car Co., St. Louis, Mo., for 1930, its Windsor White Prince 8-82 Series will be known as the 8-85 Series. In this line a 7-passenger Royal sedan to sell at \$2,045 is added. Although using a Warner transmission, the three-speed forward type is retained in this smaller series but the transmission has been equipped with a Johnson theft-proof lock in the shift lever ball.

The Series 8-92, the larger eight, powered as previously with a Continental 15S engine developing 86 b.h.p. at 3200 r.p.m., retains the Warner Hi-Flex 4-speed transmission introduced early in 1929.

Prices are as follows:

Series 8-85	
Royal Cabriolet	\$1,695
Royal Victoria Coupe	1,695
Royal 5-passenger Petite Sedan	1,695
Royal 5-passenger Full Sedan	1,695
Royal 7-passenger Sedan	2,045
Royal 5-passenger Roadster	1,695
Series 8-92	
Royal Cabriolet	\$1,995
Royal Victoria Coupe	1,995
Royal 5-passenger Petite Sedan	1,995
Royal 5-passenger Full Sedan	1,995
Royal 7-passenger Sedan	2,345
Royal 5-passenger Roadster	1,945

Wright to Get Medal

NEW YORK, Jan. 13—The Daniel Guggenheim Fund for the Promotion of Aeronautics in 1927 established a medal, to be awarded not oftener than annually, for notable achievement in the advancement of aeronautics. The first award, namely, the 1929 Medal, has just been announced as being awarded to Orville Wright for "design and construction, with his brother, now deceased, of the first successful engine propelled airplane." This medal will be presented to Mr. Wright in Washington on April 8, in connection with the celebration of the fiftieth anniversary of The American Society of Mechanical Engineers.

U. S. Announces New Line

DETROIT, Jan. 15—Introduction of a new 1930 line of U. S. Royal heavy service tires was announced today by the United States Rubber Co. The new line comprises a wide range of high pressure and balloon tires. The company announced the widening of its line of solid industrial tires for use on electric trucks and other interior conveyances by the addition of a large number of sizes.

Perfect Circle Production Gains

HAGERSTOWN, IND., Jan. 13—During 1929 the Perfect Circle Co., manufacturer of piston rings, produced 40,239,728 rings, according to an announcement from the company. This was said to be a new yearly production record for the company.

German Motorcycle Gain is 38 Per Cent Over 1928

WASHINGTON, Jan. 17—The number of motorcycles registered in Germany during the year ended June 30, 1929, increased 38 per cent over figures for the previous year, which in turn had shown an increase of nearly 23 per cent over the number registered during the year ended June 30, 1927, according to a report from Consul Edward A. Dow, Frankfurt-on-the-Main, made public by the Department of Commerce. Over half of the total number operating in Germany are found in Prussia.

Among the notable developments of the German motorcycle trade during the first six months of 1929 were the growing exports, the increased production of lightweight motorcycles having a cylinder capacity under 20 cc., and the general increase in output.

Of the total 9512 motorcycles imported during 1928, the United States supplied 1902, Great Britain 6046, and Belgium 616. During the first eight months of 1929 there were imported 6907, of which the United States furnished 1799, Great Britain 3976, and Belgium 532.

Stock Movement Briefed

NEW YORK, Jan. 13—Motor stocks as a group were the only ones to show a net decline in value during the year 1929, according to a survey of investments released by Frazier, Jenke & Co., investment bankers. Seven representative motor stocks showed a decline during the period Dec. 29, 1928, to Dec. 31, 1929, of \$2,606,968,000, contributing 96 per cent to a total decline of \$2,709,474,000 for 100 leading common stocks chosen from various groups.

Motor stocks, however, showed an appreciation in value of 3.3 per cent during December, as compared with the price at the end of November, and contributed their share to the total gain of the 100 representative stocks of 2.3 per cent during the month.

Lakey Declares Dividend

DETROIT, Jan. 14—A dividend of 25 cents per share has been declared by the directors of the Lakey Foundry & Machine Co., of Muskegon, Mich., payable Jan. 30 to stockholders of record Jan. 15. H. A. Becker, president, said the foundry was not now operating at capacity, but the immediate outlook was for substantially increased schedules from customers. Despite the reduction in customers' schedules for November and December, the efficient operation of the foundry resulted in a profit for those months, he said.

N. J. Registration Gains in 1929

NEW YORK, Jan. 13—Total new car registrations in New Jersey during 1929 were 122,081, according to Sherlock & Arnold. This compares with 110,767 for the year 1928. New registrations during December, 1929, showed a marked decline from December of the previous year, being only 1059 as compared with 7020 in December of 1928.

World Road Mileage Shows Gain in Year

WASHINGTON, Jan. 15—Progress in road construction throughout the world is indicated by the present mileage of 7,805,629, according to a survey of world road construction by Frank B. Curran and B. P. Root, Highway Specialists, Department of Commerce. The United States, not including Alaska and the outlying possessions, ranks first among the countries of the world with a total of 3,016,281 miles, or 38.7 per cent of the world total.

The survey shows an increase of 1,223,628 miles throughout the world over last year's figures, or 18.6 per cent, distributed as follows: America 152,662, or 4.3 per cent; Africa 57,018, or 27.7 per cent, Asia 595,547, or 142.3 per cent, and Europe 474,402, or 24 per cent. Australasia and Oceania show a decrease of 56,011 miles, or 13.7 per cent.

Detroit 1929 Sales Gain

DETROIT, Jan. 13—New passenger car registrations in the Detroit area again fell below the 1928 figure in December, with sales totaling 3084 against 5819 in December, 1928. Each of the first eight months of 1929 showed a decided gain over the corresponding month of 1928, with a gain of over 100 per cent in May. The last four months of 1929 have showed a slight decrease in registrations, compared with the corresponding months in 1928.

Total sales for the year were 114,464 against 85,355 in 1928, an increase of 29,109 (approximately 34 per cent). The total of 3084 for December shows a drop of 2735, or slightly more than 47 per cent, from the total of 5819 for December, 1928.

Ford sales amounted to approximately 38 per cent of the total registrations for the month, with a total of 1181 cars sold. Chevrolet sales last month totaled 315, with Essex ranking third with 250 cars sold. Total sales of commercial cars and buses last month were 600, bringing the total for the year to 10,141 as compared with 6642 for 1928.

Corbitt Changes Charter

HENDERSON, N. C., Jan. 13—The Corbitt Truck Co., of North Carolina, operating a truck manufacturing and sales business here, has taken out a Delaware charter and given up its North Carolina charter. The Corbitt Company is the name of the new corporation. No change in owners is involved in the transaction.

Caterpillar Sales Gain

NEW YORK, Jan. 13—Sales by the Caterpillar Tractor Corp. during 1929 established a new high record at \$51,750,000 net after deduction of commissions, royalties and other charges. This compares with sales of \$35,000,000 in 1928. The annual report will be issued early in February.

Lawrence and Bauer Tell of Foreign Sales Outlook

NEW YORK, Jan. 13—The export market for automobile accessories and shop equipment during 1930 should be a favorable one, in the opinion of speakers at the annual show dinner of the Overseas Automotive Club held last week in the Hotel Astor.

John V. Lawrence, European representative of the National Automobile Chamber of Commerce, discussed conditions in Europe and pointed out that while there would probably be recessions in certain countries these should be offset by advances in other countries. Most of the European bourses followed our own Stock Exchange in the decline of October and November, but the result has been primarily the clearing of the atmosphere by the elimination of certain financial houses that were in a shaky position.

George F. Bauer, manager of the Foreign Trade Department of the N.A.C.C., who returned to this country from a trip to South America and South Africa in time to attend the show, discussed conditions as he found them in South Africa. Here, he pointed out, the buying power of the people has been somewhat curtailed on account of reduced prices in agricultural products, but South Africa is peculiarly dependent upon the automobile for its economic development and he believes that even the curtailment of buying power at present noticeable will not retard automobile sales to any marked extent during the year. There may be a slight retardation during the first two months but the indispensability of the automobile as a producer of wealth will make it inevitable that purchases in this field will continue.

Ford Production Totaled

DETROIT, Jan. 13—The Ford Motor Co. has announced that world production of Ford cars and trucks for 1929 amounted to 1,951,092. This represents an increase of 1,132,358, or 138 per cent over 1928. Of the 1929 production, 1,709,945 cars and trucks were produced in the United States, 87,796 by the Ford Motor Co. of Canada, Ltd., and 153,351 in other foreign plants.

In 1928, production of the Model A car, which was announced in December, 1927, did not get into full swing until late in the year. On the other hand, production was curtailed in November and December, 1929, to permit changes in plant equipment for the manufacture of the new Ford body types.

Pioneer Has New Indicator

NEW YORK, Jan. 13—The Pioneer Instrument Co. has commenced commercial production of the Paulin level flight indicator, a highly sensitive precision altimeter and checking barometer. The device is scaled from 25 to 20,000 feet and is designed to furnish the pilot with continuous warning of deviations from a predetermined altitude.

No Yearly Models For Durant, Says Haynes

NEW YORK, Jan. 13—F. J. Haynes, president of Durant Motors, Inc., announced that there will be no yearly models in the program of the company when he addressed some 500 eastern dealers at the annual luncheon-meeting at the Roosevelt Hotel last week.

"Durant cars will be improved as the necessity and desirability of improvement arises," Mr. Haynes explained, "but there will be no wholesale transformations from one line to another overnight. We do not propose at any time to deliberately cut in half the value of all cars in the hands of Durant owners by announcing that all previous models are obsolete. R. T. Hodgkins, general sales manager, presided at the event. Other speakers were A. I. Philp, chairman of the board; Ralph Vail, vice-president; J. A. Nichols, Jr., secretary-treasurer. The speakers were optimistic toward 1930 and saw a particularly bright outlook for Durant. The executive group now in control assumed management of the company just one year ago.

Lycoming Announces Order

WILLIAMSPORT, PA., Jan. 14—The Lycoming Mfg. Co. has received an order for 500 airplane engines, it was announced here today by William H. Beal, vice-president, who said this represented the largest single order for this type of engine ever placed. The contract was signed by the Stinson Aircraft Corp. of Wayne, Mich., and calls for delivery of the entire order by May 1. The engines are nine-cylinder, radial type and 210 hp. This marks the official advent of Lycoming into the manufacture of airplane engines.

Canadian Goodyear Gains

TORONTO, Jan. 14—The Goodyear Tire & Rubber Co., Ltd., is reported to be making good progress in the development of a larger output, produc-

"Automotive Industries" Show Week Calendar

CHICAGO SHOW WEEK EVENTS

Jan. 25—Studebaker Corp. Banquet. Palmer House
Jan. 28-29—Automotive Electric Assn. Convention. Stevens Hotel
Jan. 28—Graham-Paige Luncheon. 1:00. Palmer House
Jan. 28—Oakland Motor Co. Banquet. 6:30. Palmer House
Jan. 29—Willys-Overland Banquet. 6:30. Palmer House
Jan. 29—Chrysler Sales Corp. Luncheon. 12:30. Congress Hotel
Jan. 29—Natl. Assn. of Automobile Show & Assn. Managers Luncheon. 12:30. Stevens Hotel

tion being increased in December by 1000 tires while a further gain of 1500 tires is anticipated for the present month.

M. and E. A. Banquet Held

NEW YORK, Jan. 13—More than 700 persons attended the annual banquet and entertainment of the Motor and Equipment Association held here last week in the roof ballroom of the Hotel Astor. "Russian Nights" was the theme which was carried out in the entertainment as well as the menu. The production offered following the dinner was entitled "Aboard the S. S. Motor and Equipment," and was conceived and arranged by Nathan M. Abramson.

Racer to Have Air Starter

LONDON, Dec. 28—It was decided recently that the 4000 hp. two-engined Sunbeam car (see *Automotive Industries* of Nov. 23) now being built to attack Sir Henry Segrave's speed record of 231.4 m.p.h., will be fitted with the Herzmark compressed air starter. The compressor will not be fitted to the car, only the air motor, and the energy probably will be derived from a separate air reservoir charged by a compressor on an attendant Sunbeam passenger car.

Miller-Schofield Plans National Distribution

LOS ANGELES, Jan. 15—Production plans of Schofield, Inc., of America, which recently took over the Harry A. Miller plant, call for a 1930 increase exceeding 500 per cent; for the establishing of national distribution, and granting of license to manufacture Miller products to four or more factories located in cities east of the Rocky Mountains, Vice-President G. L. Scofield has announced.

Sales contracts totaling \$1,500,000 already are pending. National distribution of Miller carburetors will be a feature of its sales campaign. Special types of Miller engines for racing on speedways, water and for aviation will be announced early in 1930. Mass production will include speed heads for Ford automobiles; marine and automobile engines, both commercial and racing; aviation engines; alloyanum pistons and various Miller repair parts.

Society Changes Name

NEW YORK, Jan. 13—Engineering Foundation, Inc., successor to United Engineering Society, has been organized by the American Society of Civil Engineers, American Institute of Mining and Metallurgical Engineers, The American Society of Mechanical Engineers and the American Institute of Electrical Engineers. The formation of the Foundation is merely a change in name from United Engineering Society, which former name has caused much confusion in the past.

Auburn Production Gains

CHICAGO, Jan. 13—Auburn Automobile Co. established a new production record of nearly 25,000 cars in 1929, compared with 12,899 in 1928, an increase of almost 100 per cent, E. L. Cord, president, announced last week. Plans are being laid for even greater production in 1930, Mr. Cord said.

Calendar of Coming Events

SHOWS

Boston, AutomobileJan. 18-25
Detroit, AutomobileJan. 18-25
Baltimore, AutomobileJan. 18-25
Harrisburg, AutomobileJan. 18-25
Louisville, AutomobileJan. 18-25
Hartford, AutomobileJan. 18-25
Pittsburgh, Pa., AutomobileJan. 18-25
Brooklyn, AutomobileJan. 18-25
Montreal, AutomobileJan. 18-25
Louisville, AutomobileJan. 18-25
Plainfield, N. J., AutomobileJan. 18-25
Los Angeles, AutomobileJan. 18-26
Rochester, AutomobileJan. 20-25
Nashville, AutomobileJan. 20-25
Wilmington, Del., AutomobileJan. 20-25
Paterson, N. J.Jan. 20-25
Chicago National Coliseum. Jan. 25-Feb. 1
Washington, D. C., Automobile
Jan. 25-Feb. 1
Cleveland Automobile Show. Jan. 25-Feb. 1
Copenhagen Trucks, etc.Jan. 25-Feb. 2
Portland, Me., Automobile.Jan. 27-Feb. 1
Wilkes-Barre, Automobile.Jan. 27-Feb. 1
Hillsdale, Mich., Automobile. Jan. 28-Feb. 1
Lancaster, Pa., Automobile.Jan. 28-Feb. 1
San Francisco, Cal., Automobile. Feb. 1-8
Minneapolis-St. Paul, Automobile. Feb. 1-8

Toledo, Ohio, AutomobileFeb. 3-8
Wichita, AutomobileFeb. 3-8
Cumberland, AutomobileFeb. 3-8
Syracuse, AutomobileFeb. 3-8
Ottawa, AutomobileFeb. 3-8
St. Louis, AutomobileFeb. 3-8
Elgin, Ill., AutomobileFeb. 5-8
Cincinnati, AircraftFeb. 8-14
Albany, AutomobileFeb. 8-15
Akron, AutomobileFeb. 8-15
Kansas City, AutomobileFeb. 8-15
Columbus, Ohio, Auto-PlaneFeb. 9-13
New York, American Legion, AviationFeb. 9-15
Denver, AutomobileFeb. 10-15
Indianapolis, AutomobileFeb. 10-15
Sheboygan, AutomobileFeb. 10-16
Mankato, AutomobileFeb. 12-15
Peoria, AutomobileFeb. 12-16
Providence, AutomobileFeb. 14-22
Canton, AutomobileFeb. 15-22
Omaha, AutomobileFeb. 17-22
Copenhagen, AutomobileFeb. 21
Los Angeles, Automobile. Feb. 22-March 2
Camden, N. J., Automobile. Feb. 24-Mar. 1
Des Moines, Automobile.Feb. 24-Mar. 1
Seattle, Wash., Automobile. Feb. 25-Mar. 2
Detroit (All-American Aircraft). April 5-13
Asbury Park, N. J., Automobile. April 7-12

CONVENTIONS

American Institute Electrical Engineers,
New YorkJan. 27-31
National Automobile Dealers Association, ChicagoJan. 27-28
Ohio Assn. of Commercial Haulers, ClevelandJan. 30-31
Southwest Road Show and School, WichitaFeb. 25-28
American Society for Testing Materials, Regional Meeting, DetroitMar. 19
American Society Mechanical Engineers, Fiftieth Anniversary Celebration:
New YorkApril 6
Hoboken, N. J.April 7
Washington, D. C.April 8-9
World Power Conference, Berlin. June 16-25
American Railway Association, San FranciscoJune 23-26

S. A. E.

Annual Meeting, Detroit.Jan. 21-24

SALONS

Hotel Biltmore, Los Angeles.Feb. 8-15
Palace Hotel, San Francisco, Feb. 22-Mar. 1